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The 1995 update to the atomic mass evaluation

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Abstract

This paper presents a complete list of "mass excesses", which is an update of the similar values in the 1993 Atomic Mass Evaluation, and a list of the isomeric transition energies which are best determined from a combination of masses. A list of new or revised experimental data for mass determination is also given. The significance of these data, and their possible deviation from earlier ones or from expectations are discussed. Adopted new procedures and policies are presented.

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1. Introduction

In 1993, we published the "1993 Atomic Mass Evaluation" (Ame'93) [I]-[IV], a set of tables and graphs based on an evaluation of atomic masses from experimental data and, for a few nuclides, from values obtained by extrapolation.

The present work is the first update of those tables in a regular series as announced in Ame'93. Updates are accompanied by electronic versions of the full mass table and tables of reaction and separation energies, distributed by the newly created Atomic Mass Data Center (AMDC) and by the usual nuclear data centers as for the 1993 ones [1]. The published version of the present update contains only a full list of atomic mass excesses ($(M - A)$) (Table I) and of isomeric excitation energies (Table II), a list of new or revised experimental data (Table III), and comments on the new data and their evaluation. A list of references for these data is also given in Table III. The next update is foreseen in 2 years and will be followed by a full publication of the AME in 1999.

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The mass excess values given in Table I are expressed in energy units. For the precise meaning of the energy unit we refer to [IV], Section 2. Full mass values or nuclear binding energies can be calculated as described in Section 3.

In the description below quoted works that are also referenced in Table III are given in the same Nuclear Data Sheets style as there.

The cut-off date for the data from literature used in the present Ame'95 evaluation was April 30, 1995. Preprints and private communications that were received until June 30, 1995 have also been included. The final calculation was performed in October 1995.

2. New features

In Ame'93, the table of masses and of nuclear-reaction and separation energies gave values *"derived from all experimental data"* where available. Special tables (Table B and Table C in [I]) gave cases where, based on an analysis of systematic trends of masses, or of mass differences like decay energies and neutron and proton binding energies, we recommended to replace some particular (see Section 9) experimental data by values considered more dependable. In the present Tables I and II, these more widely used *"best recommended values"* for masses and isomeric excitation energies are given. Table IV lists the few new or removed cases in this category, and the consequences on the mass values if the deviating data were used. The table of masses derived from "all experimental data" is, as usual, available electronically.

The names and the chemical symbols of the elements 104 to 109 as recommended recently by the Commission on Nomenclature of Inorganic Chemistry of the International Union of Pure and Applied Chemistry (IUPAC) were used: 104 dubnium (Db), 105 joliotium (Jl), 106 rutherfordium (Rf), 107 bohrium (Bh), 108 hahnium (Hn), and 109 meitnerium (Mt). This choice is made for convenience and does not express a preference. For the elements 110 and 111 we use the provisional symbols Xa and Xb.

Among the new features in this evaluation, our policies in the treatment of isomers has been improved. As in Ame'93, we present a list of excited states involved in this evaluation (Table II). However, excitation energies following from precision γ-ray measurements are combined, where necessary, with reaction energies to the relevant state. Thus, such energies are only mentioned in remarks to the table of input data. Excitation energies obtained from combination of masses of different nuclides are best determined from the evaluation of masses. Therefore we think it useful to give, in each of our updates, a full list of those excitation energies, as we do for the ground-state masses. Section 8 is devoted to the isomer issue and discusses further our policies, illustrated by some particular cases.

In making estimates for unknown masses we take into account all available experimental information. In particular, knowledge of stability or instability against particle emission or limits on proton or alpha emission yield upper or lower limits on the separation energies.

Table A
The most precise masses

	Mass excess (keV)		Atomic mass (μu)	
^{1}n	8071.3228	0.0022	1008664.9232	0.0022
^{1}H	7288.96940	0.00064	1007825.03214	0.00035
^{2}H	13135.7196	0.0010	2014101.77799	0.00036
^{3}H	14949.7942	0.0015	3016049.2675	0.0011
^{3}He	14931.2036	0.0014	3016029.30970	0.00086
^{4}He	2424.91109	0.00095	4002603.2497	0.0010
^{13}C	3125.01081	0.00095	13003354.8378	0.0010
^{14}C	3019.8923	0.0037	14003241.9884	0.0040
^{14}N	2863.41701	0.00083	14003074.00524	0.00086
^{15}N	101.43823	0.00085	15000108.89844	0.00092
^{16}O	−4736.9983	0.0015	15994914.6221	0.0015
^{20}Ne	−7041.9297	0.0019	19992440.1759	0.0020
^{28}Si	−21492.7931	0.0024	27976926.5327	0.0020
^{40}Ar	−35039.8897	0.0039	39962383.1232	0.0030

3. Table of mass excesses in keV*

Table I gives values in the keV* units defined in [IV], Section 2. Only for the most precise values, it is important that they are a fraction of a ppm different from the same quantities expressed in the international volt. The masses M in mass units u, and the binding energies B in keV* can be calculated using the relations:

$$M = A + D/931493.86,$$

$$B = Z \times D(\mathrm{H}) + N \times D(\mathrm{n}) - D$$

with respective approximate standard deviation errors:

$$m = \delta/931493.86,$$

$$b = \sqrt{(Z \times \delta(\mathrm{H}))^2 + (N \times \delta(\mathrm{n}))^2 + \delta^2}$$

in which D is the mass excess $[M(\text{in u}) - A]$, in keV*, and δ its one standard deviation error, as given in Table I. In almost all cases the error contribution due to H can be neglected, but that due to the neutron makes, in a few cases, the values of B less precise than their corresponding D.

For the most precise masses the formula for calculating m is not exact. Table A gives for them values of both mass excesses and atomic masses with increased significant digits.

The uncertainties in mass differences, e.g. the β-decay energies given in [I], cannot be derived correctly from the present tables. They can be found in the tables made available electronically [1]. In all but a few cases, they differ very little from the uncertainties given in [I] and [II].

A table of correlation coefficients as in [II] is not given here but is available electronically from the Atomic Mass Data Center [1].

4. New elements and a new (semi-) magic number

Very recently, the Darmstadt group [95Ho03], [95Ho.A] and [95Ho04] announced the discovery of isotopes ^{269}Xa, ^{271}Xb and ^{272}Xb of the elements 110 and 111. Earlier, a Berkeley group [95Gh04] had announced the possible observation of ^{267}Xa. Although the reported α-particle energies probably do not belong to branches to the ground-states of their daughters, they nevertheless give information of use for getting good estimates for the masses of very heavy nuclides.

Another important discovery in this region is due to a collaboration of Livermore and Dubna physicists who found the existence of a sub-shell closure at $N = 162$. In a first paper they reported the observation of two new isotopes of element $Z = 106$ and interpreted the results as evidence for extra stability at $Z = 108$ and $N = 162$ [94La22]. And at the ENAM'95 conference, Oganessian et al. [95Og.A] reported the discovery of ^{273}Xa, the first nuclide with $N = 163$, which exhibits a drastic increase of the α-energy, confirming the subshell closure at $N = 162$. Such an effect could be responsible for the amazing fact that the increasing probability for spontaneous fission, so evident for elements until $Z = 104$, is far less prominent than expected beyond this element. This closure was predicted by Cwiok et al. [2]. It is worth mentioning that, in a recent paper, Brenner et al. found, in an analysis of the first 2^+ states in even–even nuclides, that a spherical subshell might close at $N = 164$ [3]. It would be interesting to repeat this analysis with the assumption of a sub-shell closure at $N = 162$ as observed by [95Og.A].

5. New data from mass spectrometry

5.1. Stable nuclides

Data with high precision (of the order of 1 part in 10^{10}) are reported by the MIT group [94Di.A] using a Penning-trap spectrometer. A careful evaluation of the systematic errors and analysis of the obtained data allowed this group to achieve very satisfactory internal consistency checks. Their impressive report [94Di.A] is, in this sense, recommendably complete. Yet, they should not remain unchallenged: checks by another group, at the same level of precision, are highly desirable to strengthen the validity of their mass measurements, and transform these very precise measurements into very accurate ones. Some of their results were already used in the 1993 tables and have been revised only slightly (except for the ^{12}C+^{2}H–^{14}N combination). New is the result for ^{28}Si where 2 orders of magnitude in precision have been gained compared to Ame'93. From this result follow improved values for the other stable Si isotopes. This may become important in future for the definition of the mass unit, the kg. If it is defined in terms of the atomic mass unit, by accepting a defined value for the Avogadro constant, realization of a mass standard may be best done by constructing an ultrapure Si crystal. New also is the result for ^{15}N, of importance for the calibration of γ-ray energies (see Section 6.1).

Other groups working with Penning-trap spectrometers in Ohio and Stockholm have obtained results for D, ^{20}Ne, ^{22}Ne and ^{28}Si (and a preliminary value for the hydrogen mass) which confirm, at their respective level of accuracies, the corresponding more precisely known masses. Also interesting is the measurement of ^{86}Kr [95Ca.A] improving the accuracy of this mass by a factor of 4.

Classical mass-spectrometry on stable and nearly β-stable nuclides along the "backbone" is also producing results, like the new values for Xe, obtained at Winnipeg. Their planned measurements on Hg isotopes to solve the mercury problem (Section 7 in [IV]) are eagerly awaited.

5.2. *Nuclides far from stability*

The nuclides somewhat removed from the line of stability, especially the most exotic ones, are of interest in helping to determine the yet poorly known trends of the mass-surface, i.e. the behavior of the binding energies for large differences between numbers of neutrons and of protons. This is reflected in the excessively large deviations amongst the predictions of the models (see e.g. ref. [4]) notably along the astrophysical r-process paths. Yet, the longest isotopic chains known with fair precision (40 keV) does not exceed 28 nuclides (for Cs) or 33 in the case of Pb (though interrupted).

We must, in the first place, mention the new Penning trap measurements [95Ha.1], [95Bo.1] on heavy Rb, Sr, Cs and Ba isotopes, obtained after the move to the new ISOLDE facility. They led to drastically improved accuracies far from stability. For the lighter Rb isotopes, the differences with earlier data on isobaric Sr mass values agree quite well with the reported values for the Rb(β^-)Sr decay energies. This makes it even more amazing that the Sr values do not agree so well with the reported β-decay energies of these isotopes and their daughters. The dependability of the Penning-trap measurements after dismounting and reassembly of the apparatus is assessed by the perfect agreement obtained for the heavy Cs and Ba isotopes before and after the move. In our 1993 mass adjustment, the ^{91}Sr(β^-) decay energy was already one of the three somewhat severe difficulties mentioned in Section 3.2 of [IV]. Values of 2669(10) [53Am08], 2684(4) [73Ha11] and 2704.5(3.0) keV [80De02] were reported, to which one could add the McGill value 2709(15) [83Ia02]; but the new doublets implicate a value 2730(10) keV, higher than all of them. Re-studying the three papers mentioned, we found no reason to distrust the first two, measured with magnetic spectrometers. The third was measured with a semiconductor spectrometer; but we note that the error above is the one mentioned in the abstract and that the text mentions errors of 5 and 8 keV. But even the latter does not quite cover the difference with the mass spectrometer result. This is just one example, albeit the most worrisome, of difficulties we had with the new values. Our studies, together with that of Hartmann [94Ha.A], led to a revision of some error values reported by the authors in ref. [80De02] and of the consistency factors (see below) of some other mass-spectrometric data. The decay energy of ^{91}Rb(β^-) has also been increased due to the feeding of the 93.628 keV level in ^{91}Sr. Nevertheless, the overall consistency of the data in the $A = 88$–96 region leaves something to be desired.

A very recent improvement [5] in this Penning trap spectrometer allowed mass-measurements [95Be.A] of some rare-earth nuclides (^{143}Pm, ^{139,140,142,143}Sm and ^{143}Eu). The previously well determined masses are checked within the estimated uncertainties. Most interesting is the result obtained for ^{140}Sm for which in Ame'93 we gave a "recommended" mass 380 keV below the one derived from decay data: the new result agrees perfectly well with our estimate. The value obtained for ^{143}Eu is in very good agreement with the new result from St Petersburg [94Po26]; they both solve the earlier (slight) discrepancy among 3 β^+-decay energies for this nuclide (see [IV], p. 294): the value of [74Ch21] is now at 3.5σ from the adopted average. In these Penning trap experiments, contaminations give clear signatures and we can thus have confidence in the obtained results. For ^{154}Dy some doubt existed in the early analysis used here about a possible contamination, therefore we did not accept it in the present evaluation.

A new experiment by the SPEG group at GANIL has been mentioned recently [6] for proton-rich nuclides along the rp-process path, but unfortunately their analysis was not completed in time to be included in the present update. Also at GANIL, a new method using the CSS2 cyclotron [95Le.B] yielded the first direct mass-measurement of ^{100}In with a precision of 420 keV, in perfect agreement with the value found indirectly in its delayed-proton decay spectrum [95Sz01].

Last but not least, the ESR group [7] reported the measurement of a wealth of new masses in the p-rich region around Pb. They could not be used here, but it is expected that they will have an important contribution to the next update.

5.3. Mass-spectrometric consistency factors

In the past, we found reasons to increase errors reported for results obtained with classical mass spectrometers. This is not so for results reported with Penning trap instruments. Therefore, in this Ame'95 update, we no longer increase the errors reported for them. This is also true for the new ISOLTRAP measurements on Rb, Sr and rare-earth nuclides: they are accompanied by some new measurements on neutron-rich Cs and Ba isotopes which agree satisfactorily with reaction and decay data. We therefore decided for the time being, to accept these Penning trap measurements as they stand, and to live with the bad consistency reported in the previous section.

We found that on-line mass measurements of the Orsay-ISOLDE group performed in the early eighties agree somewhat less good with newer data than suggested by the "consistency factor" of 1.5 that we used earlier. We felt forced to increase it to 2.5. As a result a few mass values, for the most exotic nuclides, are now given with larger uncertainties than in Ame'93.

Also the mass measurements of the St-Petersburg group with the PRISM spectrometer [8], performed until now only for 7 isotopes of Rb, do not agree well with other data, exhibiting a systematic deviation with N and a large ($v/s = 4.01$) average discrepancy. The calibration procedure in which elements (Zr, Nb, Mo) different from the measured Rb were used, may have resulted in different ionization locations in the source, which may be a reason for such an effect. No other measurements with the same spectrometer have been reported since then. The necessary consistency factor CF = 4 is such that these data are outweighed by the ensemble of all the other ones.

6. New reaction and decay data

Whereas mass-spectrometric data almost always yield experimental values for masses, it is not always so for energy measurements from decays or reactions. The latter may occur between nuclides for which no mass values can be determined. If then a later experiment determines the mass of one of them, the other one follows and sometimes even more. A nice example can be found in the determination of the isomeric excitation energy of ^{181}Os by the ISOCELE group [95Ro09]. The mass of the excited isomer being known from its β^+-decay, not only the ground-state mass of ^{181}Os is now known, but also the masses of ^{185}Pt from its α-decay to ^{181}Os, of ^{185}Au from its β^+-decay and of its α-daughter ^{181}Ir.

Among the newly (since the Ame'93) measured ground-state masses, one may note nuclides beyond the neutron drip-line (^{10}He and ^{16}B) by groups at RIKEN and at HMI, and beyond the proton drip-line (^{105}Sb) by the Berkeley group; and also very neutron-rich nuclides (^{134}Sn, ^{154,155}Nd and ^{199}Ir) at Studsvik, Idaho and Daresbury, and proton-rich ones (^{86}Mo, ^{100}In, ^{137}Sm, ^{139}Eu, ^{156}Er, ^{207,208}Ac, ^{211}Th, ^{213,214}Pa, ^{219}U and ^{228,229}Pu) by groups at Kyushu, Leuven, Dubna, GSI and Jyväskylä (with RITU).

Important information is also brought, as stated above, by new data not connected to known masses. Such is the case of the proton decay of ^{112}Cs, ^{167}Ir and ^{185}Bi (Daresbury and Argonne), the β^+-decay of ^{134,135}Pm (Dubna) and the α-decay of ^{172}Au (Daresbury). Also, in the region $(Z \geqslant 82, N \leqslant 126)$, where not so many masses are known, the several α-decay energies measured at RITU plus some others from RIKEN, LBL and GSI help map the region; they are milestones awaiting connections to the backbone of masses.

Some very heavy nuclides and more especially new elements (see Section 4) have been identified and their half-lives and α-decay energies determined. With few exceptions the observed α lines do not connect ground-states, but they still give useful information in getting good estimates of the Q_α energies.

6.1. Gamma-ray recalibration

The mass spectrometric result on ^{15}N reported by the MIT group [94Di.A] (see Section 5.1) is of importance for the calibration of γ-ray energies. The change due to this result is rather larger than the uncertainty reported for the 1975 [9] value. The latter comes from notes on only one measurement left after the death of Lincoln Smith and the deviation is therefore not so surprising. Recent measurements on the ^{14}N(n,γ)^{15}N reaction by an Oak Ridge-Los Alamos group [94Ju.A] confirm the new value. It will lead to a recalibration of γ-rays in precise (p,γ) and (n,γ) reaction energies. On average, the energies are increased by about 6 ppm. The necessary corrections are numerous but only slight. They will be made in next update.

6.2. Proton emission

Several new cases have been investigated by groups at Argonne (Atlas), Berkeley, Daresbury and Garching. An older result on ^{121}Pr, not included in Ame'93, was a reason to add a number of estimated mass values between this nuclide and those given in [I]. In the estimates from systematic trends, proton decays are often quite useful in changing extrapolations into interpolations!

Noteworthy is the newly reported proton energy of ^{112}Cs which is smaller than that in ^{113}Cs, contrary to the normal increase with decreasing neutron numbers, probably reflecting a stronger neutron-proton pairing energy. Such an inversion is also observed for ^{108}I for which an upper limit of 500 keV is reported for the energy of the emitted protons. Moreover, in the latter case, since this energy must be positive, we represented this result as a measured value.

Interesting are also the new results of [95Da.A] on proton emission from nuclides up to ^{185}Bi. The results they found for proton emission of the two isomers of ^{167}Ir, and for their α-decay chains, may lead to a series of interesting isomeric excitation energies.

6.3. Other decays and reactions

Since the Ame'93 new α-energy measurements have been performed by groups at Leuven, Oak Ridge, Daresbury, Orsay and Dubna. The number of new results on β-energy measurements from groups at Buenos Aires, Dubna, GSI, Idaho, Jyväskylä, Notre-Dame, Studsvik, and elsewhere is also quite impressive. At the same time, some β^--decay data have been revised (see e.g. Section 9) often following a better knowledge of the decay schemes, or their errors have been re-evaluated (see e.g. Section 5.2). They are reported in Table III.

Quite important are the very precise differential reaction energies performed at Heidelberg on ^{40}Ar, by the Garching group on Th isotopes and also by the Tübingen-Indiana group on Hg isotopes. Thermal neutron capture γ-decays, that provide some of the most precise data, have been reported by groups at ILL and Latvia, for Ni and Ba isotopes. Among the latter we were worried by the strongly discrepant results (5.8σ) for ^{134}Ba by [93Ch21] when compared to the previous ones obtained at McMaster [90Is07] and Latvia [93Bo01]. We tend to trust the work of [90Is07] in which the calibration is carefuly described, whereas [93Bo01] who obtain the lowest value give no data on calibration. We decided to provisionally not use the latter result and live with the remaining discrepancy among the other two, which is treated by the procedure described in [IV], Section 3.2.

6.4. Final levels in α-decay

In α-decay, the energy of emitted α-particles is usually measured with good accuracy. For nuclides with an even number of protons and neutrons, the strongest branch always goes to the ground-state of the daughter. Unfortunately, this is not so for other nuclides and in many cases the energy level fed by the observed α-ray is not known. One then has only a lower estimate of the decay energy (except of course when the observed α-ray originates from an upper isomeric level).

In the region of deformation, where the Nilsson model holds, the "favored" and often most intense α-decay of an odd mass nuclide feeds the level in the daughter with the same Nilsson model quantum number assignment as in the parent. Mostly, this is not the ground state. For the region above $A = 225$, we noticed already for our 1993 mass evaluation that the distances between Nilsson particle levels in known cases did not vary greatly. We therefore made estimates, based on these systematics, of excitation energies of final levels in cases where they were not observed. In this way, we derived what we judged to be good estimates for the α-decay energies in such cases (see [10]). The values computed with the help of such estimates (and, for the rest, with purely experimental results) were indicated with a special symbol (*) different from that used for systematics (#). This policy is generalized in this Ame'95 update.

Unfortunately, the systematics of Nilsson assignments to nuclides with odd numbers both of protons and neutrons is more complicated. We did not try to make a similar analysis for them. A first review of the deformed region $A = 155$–185 seems to indicate that extrapolations of excitation energies of Nilsson levels are less dependable there.

6.5. The ^{10}Li ground-state mass

The important question of which state is the ground-state often occurs in the mass evaluation. An example is given by ^{10}Li, which is unbound to particle emission and whose states are observed as resonances. Masses have been measured in recent experiments at MSU [94Yo01] and at HMI [95Bo.A]. The apparent discrepancies among their results, and also with previous studies, are due to the different selectivities of the reactions used. The mass measured by [95Bo.A] at 240(60) keV above the one neutron threshold unambiguously corresponds to a 1^+ state with the configuration of a $1p^{1/2}$ neutron resonance coupled to the $3/2^-$core of ^{9}Li. The main peak seen at MSU [94Yo01] at 540(60) keV corresponds to a p-wave neutron resonance, and thus most probably to the 2^+ state of the same configuration, while a much weaker 'non-conclusive' peak that would correspond to an s-wave resonance might be observed at a lower mass, less than 100 keV above threshold.

Combined results of two other experiments, at MSU [11] and at GSI [95Zi.1], give strong evidence for an s-wave strength rising towards the threshold that either could be interpreted as a final state interaction without the character of a resonance, or as a true resonance. In the latter case it would be most probably a 2^- state.

We accept here, provisionally and until improved measurements are performed, the proposal of P.G. Hansen [12] based on the GSI result of a true resonance with an excitation energy below 50 keV, corroborating the weak peak of Young [94Yo01] mentioned above. However, the user of our tables should keep in mind that the resulting adopted value for the ground-state mass of ^{10}Li is not final and that in the case where the s-wave strength near the threshold should be later proved not to be a resonance, the ground-state mass would be some 200 keV higher.

6.6. ^{99}Rh isomers

A new publication [13] confirms an earlier one of [69Ph01], that the 4.7 h $9/2^+$ isomer in ^{99}Rh is 64.3(.4) keV above the 16.1 d $1/2^-$ one. We had first accepted the [74An23] conclusion that the β-decay energy of the 16.1 d isomer is larger than that of the 4.7 h one; the data of [59To.A], given only in an abstract, we trusted less. Unfortunately, the J^π systematics (see Section 8) of ground-states and excited isomers for odd-Z, even-N nuclides in this region do not show a preference for either of the two alternatives. In view of the new result, we restudied the [59To.A] work. Their rather extensive γ-β coincidence data in combination with the modern decay scheme [14] lead to the conclusion that the decay energies calculated from the four [59To.A] β-branches agreed excellently and that the lower branches found in the singles β-spectrum by [74An23] must be considered mixtures and therefore should be given little weight. A happy consequence of the resulting changes is that some earlier bad agreements with other data almost disappear.

7. Estimated mass-values for nuclides far from stability

Quite often the users of our tables are interested in unknown nuclides that are within reach of the present accelerators and isotope separators technologies. We therefore decided to estimate values for all nuclides for which at least one piece of experimental information is available (e.g. identification or half-life measurement or proof of unstability towards proton or neutron emission). In addition, we want to achieve continuity of the set of nuclides for which we estimate mass values in N, in Z, in A and in $N-Z$. This set is therefore the same as the one defined for the NUBASE database [15]. As a result, the total number of nuclear ground states for which masses are given is increased from 2650 in Ame'93 to 2931. In estimating mass values for the new nuclides, some of the methods and tools described in reference [4] have been used, together with the predicted masses from the models of Groote–Hilf–Takahashi [16] and Duflo–Zuker [17], where only the spherical parts have been considered, as illustrated in Fig. 1 for the second model.

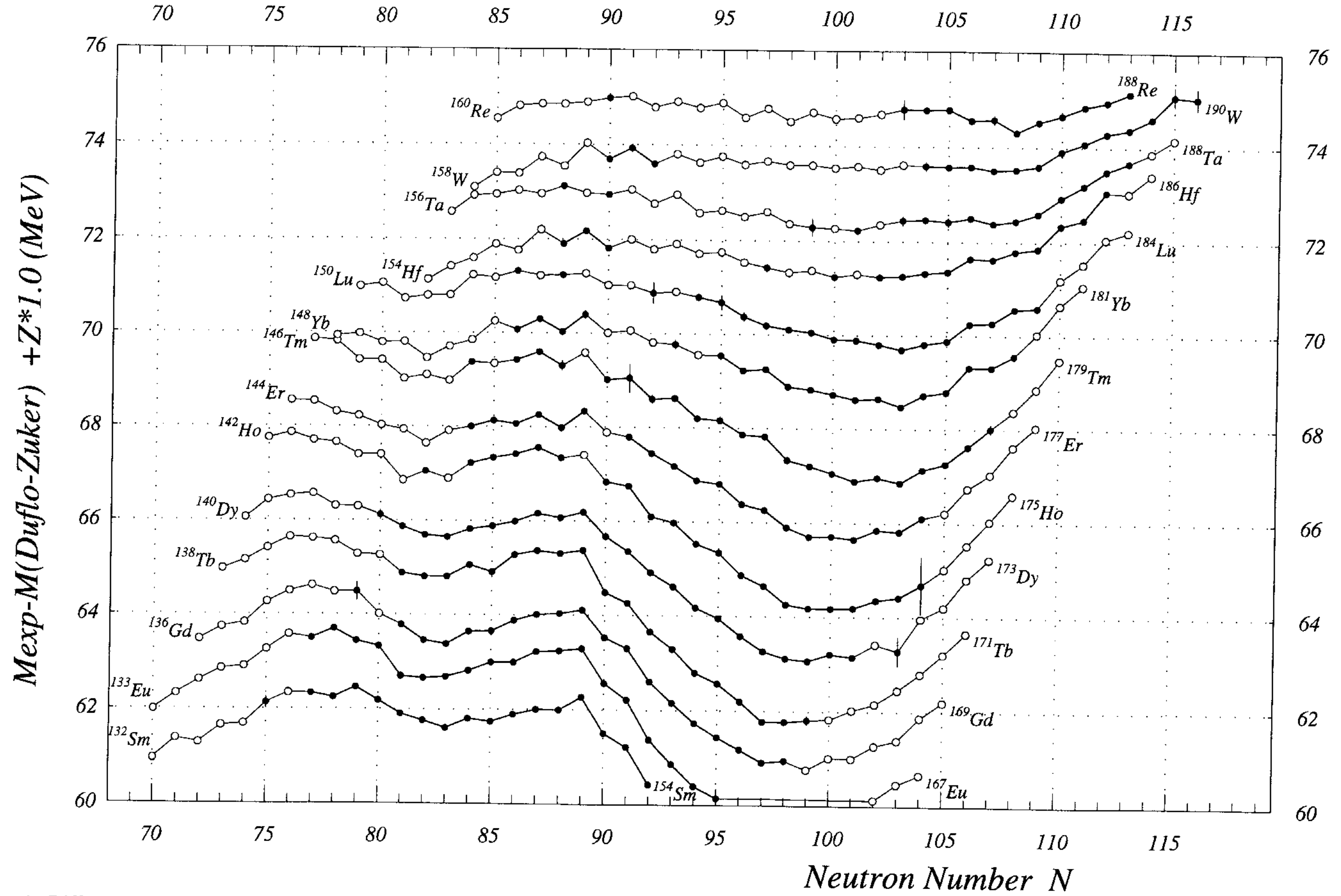

Fig. 1. Differences, in the rare-earth region, between the masses from Table I and the values predicted by the model of Duflo and Zuker [17]. Mass numbers and element symbols are indicated only along the borders of the graphs; those for the intermediate points can be derived by enumeration. Open circles represent values estimated from systematic trends; points, experimental values. Lines connect points for isotopes.

8. Treatment of excitation energies of isomers

The excitation energy of an isomer is derived either from measurement of γ-transition energies, or from a combination of reaction energies, particle decay energies and sometimes, as in the case of ^{122}Cs^{m}, mass-spectrometric data. Whereas the nuclear structure evaluators are the most qualified to give values for the excitation energies of the first category, the AME can best give values for the second category. Up to now we were interested only in those isomers which were essential in deriving the ground-state masses: those cases where experimental data allowed determination of the masses of both states. If the excitation energy of the upper level was known from γ-ray measurements, its combination with the mass of the upper level lead to a more accurate value of the mass of the ground state. If not, the data mentioned presented the best available estimate of the excitation energy of the upper isomer.

Our present policy, discussed with ENSDF evaluators, is to include in our evaluation all isomers for which the excitation energy is not derived from γ-transition energy measurements (γ-rays and conversion electron transitions), and also those for which the precision in γ-transitions is not decidedly better than that of particle decay or reaction energies leading to them.

Also, to be consistent, those very precise excitation energies derived from γ-energy measurements should be treated in the AME as any other level entering a reaction or a decay relation, i.e. their value should be added to or subtracted from the measured energy to yield a ground-state to ground-state energy. Our general policy in averaging energy lines of different levels (in the same decay or reaction and in a given experiment) is to assign to the average, the error of the most precise item, instead of the error on the average, provided these errors are not dominated by statistics. This avoids giving an over-optimistic result for that decay or reaction. The new treatment of the very precisely known isomeric excitation energies permits us to apply the above policy to them also and thus to repair a slight defect in the previous evaluations.

As a consequence, contrary to the Ame'93, the table of isomers (Table II) lists only those isomers that are evaluated here.

In order to be consistent with the database NUBASE that is currently being set up by a collaboration including the present authors [15], only upper states with half-lives larger than 1 ms are strictly called isomers and labeled by appending an 'm' or an 'n' to the nuclidic name. States with shorter half-life which are essential for the mass evaluation are labelled with 'p' or 'q', as for other levels of interest.

8.1. Uncertain assignments for isomers

In some cases the value determined by the AME for the isomeric excitation energy allows no decision as to which of the two isomers is the ground-state. This is particularly the case when the uncertainty on the excitation energy is large compared to that energy, e.g.:
$E^{m}(^{82}\mathrm{As}) = 140 \pm 200$ keV; $E^{m}(^{134}\mathrm{Sb}) = 50 \pm 150$ keV; $E^{m}(^{154}\mathrm{Pm}) = 50 \pm 130$ keV.

In the above examples all three nuclides are odd-odd ones for which in general the trends in J^π systematics are of no help. Neither could any preference for ground-state or excited state be derived from nuclear structure data. The assignment we adopted as a general rule is such that the value for E^m is positive.

There are cases, though, where data exist on the order of the isomers, e.g. if one of them is known to decay into the other one, or if the Gallagher-Moskowski rule for relative positions of combinations points strongly to one of the two as being the ground-state. There are also cases where a preferred ordering could be derived from the trends of systematics in J^π. We take these two types of constraints into consideration. In the first case the distribution of probability is truncated and only its positive part is accepted. In the second case, the ordering suggested by systematics is accepted even if it may yield a (slightly) negative value for the excitation energy, e.g. −80±190 keV for ^{84}Y, −60±110 keV for ^{108}Rh, −20±70 keV for ^{124}In or −20±60 keV for ^{195}At. Such systematics are still more useful for odd-A nuclides, for which isomeric excitation energies of isotopes (if N is even) or, similarly, isotones follow usually a systematic course. This allows to derive estimates both for the relative position and for the excitation energies where they are not known.

8.2. *Some particular isomers*

Isomers in ^{137}Pm: The possible existence of isomers may cause an uncertainty in the mass assigned to the ground-state. An example might be found in ^{137}Pm, for which Gromov et al. [95Gr.A] report a β^+-decay of its 2.4 m high-spin isomer. In the isotopes of this nuclide, the $11/2^-$ levels are the upper isomers. Yet, extrapolation of their level energies, and also consideration of their half-lives, suggest that it could also be the ground-state in ^{137}Pm. Though no isomeric activity is known for this nuclide, we nevertheless treat its data as a decay from an isomeric state located at an estimated energy of 0±100 keV to take the above uncertainty into account.

Isomers in ^{167}Ir and in its α-daughters: Another case are the α-decay sequences starting with the two isomers of ^{167}Ir [95Da.A]. Analysis of their proton decays indicates that the earlier known ^{167}Ir is in reality an upper, $11/2^-$ isomer. Its known α-decay chain involves other upper isomers, except that (as was known earlier) the last member, ^{151}Tm $11/2^-$ is a ground-state. Their new data on the α-decays of the involved ground-states lead to a revision of their masses. This revision is not final; their data on the isomeric excitation energy of ^{167}Ir (as yet only known from a graph, and therefore not added yet to Table III) can only be reconciled with the data on the isomers of ^{151}Tm and their α-parents in ^{155}Ho if some of the α-transitions reported for the ground-states feed low excited states in their daughters, as it is not at all unlikely.

Isomers in ^{190}Re: The isomeric excitation energy value derived from differences in β^--decay energy is 210±290 keV. However it is also known from nuclear structure data [14] that the 6^- isomeric state should lie above the 3^- level at 119.12 keV, resulting in a lower limit. Theoretical estimates reported in [14] give isomeric excitation energy values of 173 and 220 keV. Thus, it seems reasonable to assume an upper limit of

300 keV. From a uniform distribution of probability in the so defined allowed range 119–300 keV, we derive an energy of 210±50 keV, in agreement with all of the above information.

Isomers in ^{248}Bk: In the Ame'93 we considered the 1^- isomer to be the ground-state and derived an excitation energy of 20±50 keV for the 6^+ isomer, from a combination of β^- and α energies. This result does not agree with the nuclear structure evaluation [14] where the 6^+ state is considered as the ground-state: its long half-life (more than 9 years) places it below the 8^- state, which in turn should be below the 1^- state from the Gallagher–Moskowski rules. The excitation energy mentioned was derived from the assumption that the α-decay of ^{252}Es (spin-parity probably 5^-) feeds the high spin isomer in ^{248}Bk. It is not to be expected, though, that the ground-states in ^{252}Es and ^{248}Bk have the same Nilsson model configurations and the α-decay to the ^{248}Bk rather probably will feed a 5^- level above the ground state. We therefore now assume that this α-decay is followed by a transition, for which we give a reasonable energy.

9. Accidental deviations from systematic trends

It is well known that the mass-surface exhibits a very regular behavior with some superimposed "irregularities". Series of irregularities that could be observed for several Z at the same N or for several N at the same Z are considered as "structures" (shell or subshell-closures, shape transitions), whereas single irregularities could be called "accidents". Among the latter are cases where the result is derived from one, two or (in one case) three measurements of the **same** physical quantity, all diverging from the mentioned regularity and which were not confirmed by a different method. Only these cases are concerned here. They can be considered as incentives to remeasure the masses of the involved nuclei (and of their neighbors), **preferably by a different method**, in order to remove any doubt and possibly point out true irregularities due to real physical effects.

Following the new policy defined in the Ame'93 (ref. [I], Section 4), we continued and extended our work in flagging clearly these "accidents". In Ame'93, this action was limited mainly to experimental data for such cases, published in regular refereed journals. In the present Ame'95 update many data that appeared in other types of publication were similarly included with the same special flag (data-flag 'D', see Table III). This flag allowed to repeat an adjustment with them included, in order to derive Table IV-b and the series of tables of "purely experimental data" (see Section 2) that are available electronically.

In Table IV-a we give a list of updates for those deviating experimental data not checked by another method. We recommend to replace them by the values given in column 4, obtained from the regular trends of the atomic masses. Listed are not only those items that were not given in Table B of [I] but also those which are withdrawn from that table and those for which the recommended value and/or its uncertainty have changed (even slightly). Probably the most striking feature in this table is that it is dominated by β^+ data, which was already observable in Table B of [I]. In the second part of Table IV, we give the list of the nuclides for which the mass value is changed when the data above are included in the adjustment. Column 2 gives the modified mass value, while column 3 repeats for comparison the recommended values derived from systematic trends. We discuss below some of the items in this table.

In the ^{90}Tc(β^-)-decay, combination of the work of Iafigliola et al. [74Ia01] with later data suggested that the reported β-endpoint belongs to a mixture of transitions to the ground-state (22%) and to the 948.1 keV excited level. This removed the earlier accident.

For ^{108}Mo, a re-measurement by the same method (β^--decay) has been performed by a group in Jyväskylä and gave a result very similar to the previous one. It urged us to re-examine the surface of masses in this region to try to accommodate this constraint (see e.g. [III], figure 4). This we found not to be easy. Without making rather drastic changes, the deviation could only be decreased from 500 keV in Ame'93 to 370 keV. Now, on one hand one cannot exclude that the neighborhood of the possibly semi-magic number $N = 64$ plays a role. In fact, the experimental Q^- for the isotone ^{109}Tc (that we also label 'D') may point in the same direction. On the other hand, it sometimes happens that repeated measurements with the same method may encounter the same systematic bias. For the time being, we decided to not yet accept these two data. The situation appeals for experiments on these nuclides and on neighboring ones, more specially ^{109,110}Mo and ^{107}Nb, by a non-β^--decay method.

The new measurement of the mass of ^{140}Sm with the Penning trap spectrometer at Isolde, in perfect agreement with our estimate, removed this case from Table IV (see Section 5.2).

Due to the work of groups at GSI and Dubna, mentioned in Section 6, the ^{156}Tm(β^+)^{156}Er decay energy is now known and determines the mass of ^{156}Er to be -64260(70) keV, a much closer value to our estimated -64100#(250) keV for this nuclide in Ame'93, thus removing this case from the list.

Two out of the three data given in Ame'93 for the β-decay of ^{158}Er have been re-assigned to its daughter ^{158}Ho. The third one is in contradiction with the upper limit given by [75Bu.A] and is therefore labeled 'F'.

The new result of [94Po26] for the decay of ^{162}Lu, although not in disagreement with the older data, brings the average to a higher value that is not unacceptable when compared to systematics. They are thus accepted.

In the case of ^{176}Tm the data from [67Gu11] were re-analyzed leading to a decrease of the decay energy and at the same time the systematics have been revised yielding a value at only 120 keV from the re-analyzed experimental one. This item is therefore withdrawn from Table IV.

In one case, the mass-spectrometric triplet involving ^{204}Fr, we decided to replace the experimental value by a systematic one, not as a result of a strong deviation from systematic trends but because of the unpleasant consequences on the errors of its descendants, more particularly its grand-daughter ^{192}Tl for which we can give a quite accurate estimate of the mass derived from its double-β decay energy (compare [I], p. 56 and the present value in Table I).

Finally, consideration of the reports on the β^--decay of ^{204}Au showed that the accepted decay energy belonged to a 4 s activity whereas later only a ten times longer half-life was found connected with this nuclide. This data is now flagged 'F' and replaced by a systematic estimate.

10. General information

The table of masses (Table I) and the table of nuclear reaction and separation energies (Ref. [II]) are available electronically [1] at the "Atomic Mass Data Center" (AMDC) and at the usual nuclear data centers. A total of six files can be obtained. The first file with name **mass_rmd.mas95** contains the table of masses, as printed here plus the binding energies, the β-decay energies and the atomic masses. The next two files correspond to the table of reaction and separation energies (cf. [II]) in two parts of 6 entries each: **rct1_rmd.mas95** for S_{2n}, S_{2p}, Q_α, $Q_{2\beta}$, $Q_{\epsilon p}$ and $Q_{\beta n}$, and **rct2_rmd.mas95** for S_n, S_p, $Q_{4\beta}$, $Q_{d,\alpha}$, $Q_{p,\alpha}$ and $Q_{n,\alpha}$. The three last files with names **mass_exp.mas95, rct1_exp.mas95** and **rct2_exp.mas95** are identical to the first three ones except for the values resulting from the use of the few deviating experimental data, listed in Table B of [I] and updated in Table IV here. Most readers can best use the set of recommended tables (labelled with 'rmd') whereas the more specialized user could with benefit analyze the second set with label 'exp'.

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Table I. Atomic mass table

EXPLANATION OF TABLE

A	Mass number $A = N + Z$.
Elt.	Element symbol (for Z > 103 see Section 2).
Orig.	Origin of values for secondary nuclides. zp nn : mass of ^{A}Z derived from mass of $^{A+z+n}(Z+z)$. Special notations: IT when $z = 0, n = 0$; $+$ when $z = +1, n = -1$; $-$ when $z = -1, n = +1$; $++$ when $z = +2, n = -2$; ϵp when $z = -2, n = +1$; $+\alpha$ when $z = +2, n = +2$; x for distant connection.
S	Flag (♦) for nuclei for which masses estimated from systematical trends are thought better than the experimental masses.
Mass excess	Mass excess $[M(\text{in u}) - A]$, in keV, and its one standard deviation error. In cases where the furthest-left significant digit in the error was larger than 3, values and errors were rounded off, but not to more than tens of keV. (Examples: $2345.67 \pm 2.78 \rightarrow 2345.7 \pm 2.8$, $2345.67 \pm 4.68 \rightarrow 2346 \pm 5$, but $2346.7 \pm 468.2 \rightarrow 2350 \pm 470$). # in place of decimal point: value and error derived not from purely experimental data, but at least partly from systematic trends. $*$ in place of decimal point: value and error, for nuclei beyond $A = 225$ derived from purely experimental data but including estimates of excitation energies from application of the Nilsson model (see Section 6.4).

A	Elt.	Orig.	S	Mass excess (keV)	
1	n			8071.323	0.002
	H			7288.969	0.001
2	H			13135.720	0.001
3	H			14949.794	0.001
	He			14931.204	0.001
4	H	−n		25930	110
	He			2424.911	0.001
	Li	−p		25320	210
5	H	−nn		36830	950
	He	−n		11390	50
	Li	−p		11680	50
	Be	x		38000#	4000#
6	H	−3n		41860	260
	He			17594.1	1.0
	Li			14086.3	0.5
	Be	−		18374	5
7	He	+		26110	30
	Li			14907.7	0.5
	Be			15769.5	0.5
	B	+3n		27870	70
8	He			31598	7
	Li			20946.2	0.5
	Be			4941.66	0.04
	B			22921.0	1.1
	C	4n		35094	23
9	He	++		40820	60
	Li			24953.9	1.9
	Be			11347.6	0.4
	B	−		12415.7	1.0
	C	−pp		28913.7	2.2
10	He	++		48810	70
	Li	−n		33050	15
	Be			12606.6	0.4
	B			12050.8	0.4
	C	−		15698.6	0.4
	N	−		39700#	400#
11	Li			40796	27
	Be	−n		20174	6
	B			8668.0	0.4
	C			10650.5	1.0
	N	+3n		24960	180
12	Li	x		50100#	1000#
	Be	−nn		25076	15
	B	+pn		13368.9	1.4
	C			0.0	0.0
	N			17338.1	1.0
	O	−pp		32048	18
13	Be	IT		33660	500
	B	−nn		16562.2	1.1
	C			3125.011	0.001
	N			5345.46	0.27
	O	+3n		23111	10
14	Be	x		39880	110
	B	+		23664	21
	C			3019.892	0.004
	N			2863.417	0.001
	O			8006.46	0.07
	F	x		33610#	400#
15	B	+3p		28967	22
	C	−n		9873.1	0.8
	N			101.438	0.001
	O			2855.4	0.5
	F	p4n		16780	130
16	B	x		37080	60
	C	−nn		13694	4
	N	−n		5683.4	2.6
	O			−4736.998	0.001
	F	−		10680	8
	Ne	−−		23992	20
17	B	x		43720	140
	C	2p−n		21037	17
	N	+p		7871	15
	O			−809.00	0.21
	F			1951.70	0.25
	Ne	+3n		16490	50
18	B	x		52320#	800#
	C	++		24920	30
	N	+		13117	20
	O			−782.1	0.8
	F			873.4	0.6
	Ne	−pp		5306.8	1.5
	Na	x		25320#	400#
19	B	x		59360#	400#
	C	x		32830	110
	N	p−2n		15860	16
	O	−n		3334	3
	F			−1487.40	0.07
	Ne	−		1751.1	0.6
	Na	p4n		12929	12
20	C	x		37560	200
	N	x		21770	50
	O	−nn		3796.9	1.2
	F			−17.40	0.08
	Ne			−7041.930	0.002
	Na	−		6845	7
	Mg	4n		17571	27
21	C	x		45960#	500#
	N	x		25230	90
	O	−3n		8062	12
	F	−nn		−47.6	1.8
	Ne			−5731.72	0.04
	Na	−p		−2184.3	0.7
	Mg	+3n		10912	16
	Al	x		26120#	300#
22	C	x		52580#	900#
	N	x		32080	200
	O	−4n		9280	60
	F	+		2794	12
	Ne			−8024.34	0.22
	Na			−5182.1	0.5
	Mg	+nn		−396.8	1.4
	Al	x		18180#	90#
	Si	x		32160#	200#
23	N	x		37740#	710#
	O	x		14620	100
	F	p−2n		3330	80
	Ne	−n		−5153.64	0.25
	Na			−9529.49	0.21
	Mg			−5472.7	1.3
	Al	p4n		6767	25
	Si	x		23770#	200#
24	N	x		47040#	500#
	O	x		18970	310
	F	x		7540	70
	Ne	−nn		−5948	10
	Na	−n		−8417.60	0.22
	Mg			−13933.38	0.19
	Al	−		−55	4
	Si	−−		10755	19
	P	x		32000#	500#
25	O	x		27140#	370#
	F	x		11270	80
	Ne	2p−n		−2060	40
	Na			−9357.5	1.2
	Mg			−13192.73	0.19
	Al	−p		−8915.7	0.7
	Si	+3n		3825	10
	P	x		18870#	200#
26	O	x		35160#	430#
	F	x		18290	120
	Ne	++		430	50
	Na			−6902	14
	Mg			−16214.48	0.19
	Al			−12210.34	0.20
	Si	+nn		−7145	3
	P	x		10970#	200#
	S	x		25970#	300#
27	F	x		25050	420
	Ne	x		7090	90
	Na			−5580	40
	Mg	−n		−14586.50	0.20
	Al			−17196.83	0.13
	Si	−		−12384.43	0.16
	P	p4n		−750	40
	S	−		17510#	200#
28	F	x		33230#	510#
	Ne	x		11280	110
	Na			−1030	80
	Mg	+		−15018.8	2.0
	Al	−n		−16850.55	0.14
	Si			−21492.793	0.002
	P	−		−7161	4
	S	−−		4070	160
	Cl	x		26560#	500#
29	F	x		40300#	580#
	Ne	x		18020	300
	Na			2620	90
	Mg	−3n		−10661	29
	Al	−nn		−18215.5	1.2
	Si	−n		−21895.025	0.028
	P	−p		−16951.9	0.7
	S	+3n		−3160	50
	Cl	x		13140#	200#

A	Elt.	Orig.	S	Mass excess (keV)	
30	Ne	x		22240	820
	Na			8590	90
	Mg			−8880	70
	Al	+		−15872	14
	Si	−n		−24432.88	0.04
	P	−p		−20200.6	0.4
	S	+nn		−14063	3
	Cl	x		4440#	200#
	Ar	x		20080#	300#
31	Ne	x		30840#	900#
	Na	x		12660	160
	Mg	x		−3220	80
	Al	p−2n		−14954	20
	Si	−n		−22948.96	0.07
	P			−24440.99	0.18
	S	+n		−19044.9	1.5
	Cl	p4n		−7060	50
	Ar	−		11300#	210#
32	Ne	x		37180#	880#
	Na	x		18300	480
	Mg	x		−800	100
	Al	x		−11060	90
	Si	−nn		−24080.9	2.2
	P	−n		−24305.32	0.19
	S			−26015.98	0.11
	Cl	−		−13331	7
	Ar	− −		−2180	50
	K	x		20420#	500#
33	Na	x		25510	1490
	Mg	x		5200	150
	Al	x		−8500	70
	Si	+n2p		−20492	16
	P	+		−26337.7	1.1
	S			−26586.24	0.11
	Cl	−p		−21003.5	0.5
	Ar	+3n		−9380	30
	K	x		6760#	200#
34	Na	x		32510#	1050#
	Mg	x		8450	260
	Al	x		−2860	90
	Si	+pp		−19957	14
	P	+pn		−24558	5
	S			−29931.85	0.10
	Cl	−p		−24440.57	0.12
	Ar	+nn		−18378	3
	K	x		−1480#	300#
	Ca	x		13150#	300#
35	Na	x		41150#	1550#
	Mg	x	◆	16290#	440#
	Al	x		−60	140
	Si	2p−n		−14360	40
	P	+p		−24857.6	1.9
	S			−28846.37	0.09
	Cl			−29013.51	0.04
	Ar	−		−23048.2	0.8
	K	p4n		−11167	20
	Ca	x		4440#	70#
36	Mg	x		20910#	900#
	Al	x		5920	270
	Si	x		−12400	100
	P	+		−20251	13
	S	+p		−30663.96	0.23
	Cl			−29521.89	0.08
	Ar			−30230.44	0.25
	K	−		−17425	8
	Ca	4n		−6440	40
	Sc	x		13900#	500#
37	Mg	x		29100#	900#
	Al	x		9600	540
	Si	x		−6520	130
	P	p−2n		−18990	40
	S	−n		−26896.22	0.25
	Cl			−31761.52	0.05
	Ar			−30948.0	0.3
	K	−p		−24799.24	0.27
	Ca	+3n		−13161	22
	Sc	x		2840#	300#
38	Al	x		15740#	560#
	Si	x		−3740	270
	P	x		−14470	140
	S	+		−26861	7
	Cl	−n		−29797.98	0.11
	Ar			−34714.8	0.5
	K			−28801.7	0.7
	Ca	+nn		−22059	5
	Sc	x		−4940#	300#
	Ti	x		9100#	250#
39	Al	x		20400#	600#
	Si	x		2140#	400#
	P	x		−12650	150
	S	2p−n		−23160	50
	Cl			−29800.7	1.7
	Ar	+		−33242	5
	K			−33806.84	0.28
	Ca	−		−27276.3	1.8
	Sc	2n−p		−14168	24
	Ti	−		1230#	100#
40	Si	x		5400#	500#
	P	x		−8340	200
	S	x		−22850	230
	Cl	+		−27560	30
	Ar			−35039.890	0.004
	K			−33535.02	0.27
	Ca			−34846.11	0.29
	Sc	−		−20526	4
	Ti	− −		−8850	160
	V	x		10330#	500#
41	Si	x		11830#	600#
	P	x		−4840	470
	S	x		−18600	210
	Cl	x		−27340	60
	Ar			−33067.3	0.7
	K			−35558.87	0.26
	Ca			−35137.5	0.4
	Sc			−28642.2	0.3
	Ti	x		−15710#	40#
	V	x		−240#	250#
42	Si	x		15000#	700#
	P	x		80#	500#
	S	x		−17240	330
	Cl	x		−24990	110
	Ar	−nn		−34420	40
	K	−n		−35021.3	0.3
	Ca			−38546.8	0.4
	Sc			−32120.9	0.4
	Ti	−pp		−25121	5
	V	x		−8170#	200#
	Cr	x		5990#	300#
43	P	x		3080#	500#
	S	x		−12480	840
	Cl	x		−24030	160
	Ar	2p3n		−31980	70
	K	+		−36593	9
	Ca			−38408.4	0.5
	Sc	−p		−36187.6	1.9
	Ti	−n2p		−29320	7
	V	x		−18020#	230#
	Cr	x		−2140#	90#
44	P	x		9200#	700#
	S	x		−10880#	500#
	Cl	x		−19990	220
	Ar	+α		−32262	20
	K	+		−35810	40
	Ca			−41469.1	0.9
	Sc	−p		−37815.8	1.8
	Ti	−α		−37548.3	0.8
	V	x		−23850#	80#
	Cr	x		−13540#	130#
	Mn	x		6400#	500#
45	P	x		14100#	800#
	S	x		−4830#	600#
	Cl	x		−18910	650
	Ar	+n2p		−29720	60
	K	+p		−36608	10
	Ca			−40812.5	0.9
	Sc			−41069.3	1.1
	Ti	−		−39006.9	1.2
	V	p4n		−31874	17
	Cr	x		−19410#	100#
	Mn	x		−5110#	300#
	Fe	x		13560#	400#
46	P	x		22200#	900#
	S	x		−400#	700#
	Cl	x		−14790#	500#
	Ar	+pp		−29720	40
	K	+pn		−35419	16
	Ca			−43134.9	2.4
	Sc	−n		−41758.6	1.1
	Ti			−44125.3	1.1
	V	−		−37073.9	1.5
	Cr	−		−29471	20
	Mn	x		−12370#	110#
	Fe	x		760#	350#

A	Elt.	Orig.	S	Mass excess (keV)	
47	S	x		7100#	800#
	Cl	x		−11230#	600#
	Ar	2p−n		−25910	100
	K	+p		−35697	8
	Ca			−42339.7	2.3
	Sc			−44331.6	2.1
	Ti			−44931.7	1.0
	V	−p		−42003.9	1.1
	Cr	+3n		−34552	14
	Mn	x		−22260#	160#
	Fe	x		−6620#	260#
48	S	x		12100#	900#
	Cl	x		−4800#	700#
	Ar	x		−23220#	300#
	K	+		−32124	24
	Ca			−44215	4
	Sc			−44493	5
	Ti			−48487.0	1.0
	V	−		−44474.7	2.6
	Cr			−42815	7
	Mn	x		−29000#	70#
	Fe	x		−18110#	100#
	Co	x		1640#	400#
49	S	x		20500#	1000#
	Cl	x		−100#	800#
	Ar	x		−16600#	500#
	K	+		−30320	70
	Ca	−n		−41290	4
	Sc			−46552	4
	Ti			−48558.0	1.0
	V	−		−47956.2	1.3
	Cr	+n		−45325.4	2.6
	Mn	p4n		−37611	24
	Fe	x		−24580#	160#
	Co	x		−9580#	260#
50	Cl	x		7200#	900#
	Ar	x		−13100#	700#
	K	+		−25350	280
	Ca	−nn		−39571	9
	Sc	−pn		−44538	16
	Ti			−51425.8	1.0
	V	+n		−49217.5	1.3
	Cr			−50254.5	1.3
	Mn			−42621.5	1.4
	Fe	4n		−34470	60
	Co	x		−17200#	170#
	Ni	x		−3790#	260#
51	Cl	x		12600#	1000#
	Ar	x		−6300#	700#
	K	x		−22000#	500#
	Ca			−35890	90
	Sc	−p2n		−43219	20
	Ti	−n		−49726.9	1.3
	V			−52197.5	1.3
	Cr			−51444.8	1.3
	Mn			−48237.0	1.3
	Fe	+3n		−40217	15
	Co	x		−27270#	150#
	Ni	x		−11440#	260#
52	Ar	x		−1710#	900#
	K	x		−16200#	700#
	Ca	x		−32510	470
	Sc	x		−40380	230
	Ti	−nn		−49464	7
	V	−n		−51437.4	1.3
	Cr			−55412.8	1.4
	Mn	+pn		−50701.1	2.4
	Fe	−		−48329	10
	Co	x		−33920#	70#
	Ni	x		−22650#	80#
	Cu	x		−2630#	260#
53	Ar	x		5800#	1000#
	K	x		−12000#	700#
	Ca	x		−27900#	500#
	Sc	x	◆	−37970#	300#
	Ti	+		−46820	100
	V	+p		−51845	3
	Cr			−55280.6	1.4
	Mn			−54683.6	1.4
	Fe	+n		−50941.3	2.1
	Co	p4n		−42639	18
	Ni	x		−29380#	160#
	Cu	x		−13460#	260#
54	K	x		−5600#	900#
	Ca	x		−23590#	700#
	Sc	x		−34470	470
	Ti	x		−45760	230
	V	+		−49887	15
	Cr			−56928.3	1.4
	Mn	−p		−55551.3	1.7
	Fe			−56248.4	1.3
	Co			−48005.3	1.3
	Ni	4n		−39210	50
	Cu	x		−21690#	210#
	Zn	x		−6570#	400#
55	K	x		−570#	1000#
	Ca	x		−18120#	700#
	Sc	x	◆	−30340#	1030#
	Ti	x		−41810	240
	V	+		−49150	100
	Cr	−n		−55103.3	1.4
	Mn			−57706.4	1.3
	Fe			−57475.0	1.3
	Co			−54023.7	1.4
	Ni	+3n		−45330	11
	Cu	x		−31620#	300#
	Zn	x		−14920#	250#
56	Ca	x		−13240#	900#
	Sc	x		−25470#	700#
	Ti	x		−39130	280
	V	x		−46240	240
	Cr	−nn		−55289	10
	Mn	−n		−56905.6	1.4
	Fe			−60601.0	1.4
	Co	−		−56035.0	2.4
	Ni	−pp		−53900	11
	Cu	x		−38600#	140#
	Zn	x		−25730#	260#
	Ga	x		−4740#	260#
57	Ca	x		−7120#	1000#
	Sc	x		−21390#	700#
	Ti	x	◆	−34560#	930#
	V	x		−44380	250
	Cr	+		−52390	90
	Mn	−nn		−57485	3
	Fe			−60175.7	1.4
	Co			−59339.7	1.4
	Ni	+n		−56075.5	2.9
	Cu	2n−p		−47305	16
	Zn	x		−32690#	140#
	Ga	x		−15900#	260#
58	Sc	x		−15770#	800#
	Ti	x		−31570#	700#
	V	x		−40380	260
	Cr	x		−51930	240
	Mn	+		−55900	30
	Fe			−62148.8	1.4
	Co			−59841.4	1.7
	Ni			−60223.0	1.4
	Cu	−		−51660.0	2.5
	Zn	−−		−42290	50
	Ga	x		−23990#	210#
	Ge	x		−8370#	320#
59	Sc	x		−11140#	900#
	Ti	x		−26120#	700#
	V	x		−37910	330
	Cr	x		−47850	250
	Mn	+		−55473	29
	Fe	−n		−60658.4	1.4
	Co			−62223.6	1.4
	Ni			−61151.1	1.4
	Cu	−p		−56351.5	1.7
	Zn	−		−47260	40
	Ga	x		−34120#	170#
	Ge	x		−17000#	280#
60	Ti	x		−22690#	800#
	V	x		−33070	560
	Cr	x		−46830	260
	Mn	IT		−52910	270
	Fe	−nn		−61407	4
	Co			−61644.2	1.4
	Ni			−64468.1	1.4
	Cu	−		−58341.2	2.5
	Zn	−pp		−54183	11
	Ga	x		−40000#	110#
	Ge	x		−27770#	230#
	As	x		−6400#	600#
61	Ti	x		−16750#	900#
	V	x		−30360#	700#
	Cr	x		−42760	280
	Mn	x		−51740	260
	Fe	+n2p		−58917	20
	Co	p2n		−62895.0	1.6
	Ni			−64216.8	1.4
	Cu	p2n		−61979.6	1.8
	Zn	+3n		−56342	16
	Ga	x		−47350#	200#
	Ge	x		−33730#	300#
	As	x		−18050#	600#

A	Elt.	Orig.	S	Mass excess (keV)	
62	V	x		−25020#	700#
	Cr	x		−41170	370
	Mn	x		−48470	260
	Fe	+pp		−58898	15
	Co	+		−61428	20
	Ni			−66742.7	1.4
	Cu	−		−62795	4
	Zn	+nn		−61167	10
	Ga	−		−51996	28
	Ge	x		−42240#	140#
	As	x		−24960#	300#
63	V	x		−21660#	900#
	Cr	x		−35530#	700#
	Mn	x		−46750	280
	Fe	x		−55780	190
	Co	+p		−61837	20
	Ni			−65509.2	1.4
	Cu			−65576.2	1.4
	Zn			−62209.3	2.1
	Ga	−		−56690	100
	Ge	x		−46910#	200#
	As	x		−33820#	500#
64	Cr	x		−33350#	700#
	Mn	x		−43100	330
	Fe	x		−55080	280
	Co	+		−59789	20
	Ni			−67095.9	1.4
	Cu			−65420.8	1.4
	Zn			−65999.5	1.7
	Ga	−		−58835	4
	Ge	−		−54420	250
	As	−p		−39520#	360#
65	Cr	x		−27600#	900#
	Mn	x		−40890	560
	Fe	x		−51290	280
	Co	3p2n		−59164	13
	Ni	−n		−65122.6	1.5
	Cu			−67259.7	1.7
	Zn			−65907.8	1.7
	Ga	−p		−62652.9	1.8
	Ge	εp		−56410	100
	As	−p		−47060#	390#
	Se	x		−32920#	600#
66	Mn	x		−36500#	700#
	Fe	x		−50320	330
	Co	x		−56050	270
	Ni			−66029	16
	Cu			−66254.3	1.7
	Zn			−68896.3	1.5
	Ga	−		−63721	3
	Ge	−		−61620	30
	As	−	◆	−51820#	200#
	Se	x		−41720#	300#
67	Mn	x		−33700#	800#
	Fe	x		−46570	470
	Co	x		−55320	280
	Ni	+n2p		−63742	19
	Cu	+		−67300	8
	Zn			−67877.2	1.6
	Ga			−66876.7	1.8
	Ge	−n2p		−62654	5
	As	−		−56640	100
	Se	x		−46490#	200#
	Br	x		−32800#	500#
68	Fe	x		−44240#	700#
	Co	x		−51830	330
	Ni			−63486	17
	Cu	+		−65540	50
	Zn			−70004.0	1.6
	Ga	−		−67082.9	2.0
	Ge			−66977	6
	As	−		−58880	100
	Se	x		−54150#	300#
	Br	−p		−38890#	540#
69	Fe	x		−39400#	800#
	Co	x		−51050	370
	Ni	2p−n		−60380	140
	Cu	+p		−65740	8
	Zn			−68414.9	1.7
	Ga			−69321	3
	Ge			−67094	3
	As			−63080	30
	Se			−56300	30
	Br	−p		−46410#	310#
	Kr	x		−32300#	500#
70	Co	x		−46750#	700#
	Ni	x		−59490	330
	Cu	+		−62960	15
	Zn			−69559	3
	Ga			−68905	3
	Ge			−70560.3	1.7
	As	−		−64340	50
	Se	−		−61940#	210#
	Br	−	◆	−51590#	360#
	Kr	x		−40980#	400#
71	Co	x		−44960#	800#
	Ni	x		−55890	370
	Cu	p−2n		−62760	40
	Zn	−n		−67322	11
	Ga			−70136.8	1.8
	Ge			−69904.9	1.7
	As			−67892	4
	Se	−	◆	−63090#	200#
	Br	−−		−56590#	300#
	Kr	x		−46100#	300#
	Rb	x		−32300#	500#
72	Co	x		−40600#	800#
	Ni	x		−54680	470
	Cu	x		−60060#	200#
	Zn	+		−68128	6
	Ga	−n		−68586.5	2.0
	Ge			−72585.6	1.5
	As	−		−68229	4
	Se	+nn		−67894	12
	Br	+n		−59150	260
	Kr	−		−54110	270
	Rb	x		−38120#	500#
73	Ni	x		−50230#	600#
	Cu	x		−59160#	300#
	Zn	+n2p		−65410	40
	Ga	+p		−69704	6
	Ge			−71297.1	1.5
	As			−70956	4
	Se	−		−68216	11
	Br	−		−63530	130
	Kr	εp		−56890	140
	Rb	−p		−46230#	480#
	Sr	x		−31700#	600#
74	Ni	x		−48520#	700#
	Cu	x		−55700#	400#
	Zn	+pp		−65710	50
	Ga	+		−68050	70
	Ge			−73422.0	1.5
	As			−70859.6	2.2
	Se			−72212.6	1.5
	Br	−		−65306	15
	Kr	4n		−62170	60
	Rb			−51730	720
	Sr	x		−40700#	500#
75	Ni	x		−43810#	800#
	Cu	x		−54310#	500#
	Zn	+		−62470	70
	Ga	+p		−68464	7
	Ge	−n		−71855.9	1.5
	As			−73032.5	1.6
	Se			−72168.8	1.5
	Br	−		−69139	14
	Kr	+3n		−64242	15
	Rb			−57222	8
	Sr	x		−46650#	300#
76	Ni	x		−41610#	900#
	Cu	x		−50310#	600#
	Zn	+		−62040	120
	Ga	+		−66200	90
	Ge			−73212.9	1.5
	As			−72289.6	1.6
	Se			−75251.6	1.5
	Br	−		−70289	9
	Kr	+nn		−68979	11
	Rb			−60481	8
	Sr	x		−54390#	300#
77	Ni	x		−36490#	1000#
	Cu	x		−48480#	700#
	Zn	+		−58600	130
	Ga	+		−65870	60
	Ge	−n		−71214.1	1.8
	As			−73916.2	2.2
	Se			−74599.0	1.5
	Br			−73234	3
	Kr			−70171	9
	Rb			−64826	8
	Sr	εp		−57970	150
	Y	x		−46930#	300#
78	Ni	x		−33720#	1100#
	Cu	x		−43960#	800#
	Zn	+		−57220	160
	Ga	+		−63660	80
	Ge	−nn		−71862	4
	As	+pn		−72816	10
	Se			−77025.7	1.5
	Br	−		−73452	4
	Kr			−74160	7
	Rb			−66936	8
	Sr	x		−63175	8
	Y	x		−52630#	400#

A	Elt.	Orig.	S	Mass excess (keV)	
79	Cu	x		−41660#	900#
	Zn	+	◆	−53400#	270#
	Ga	+		−62490	120
	Ge	+		−69490	90
	As	+p		−73636	6
	Se	−n		−75916.9	1.5
	Br			−76068.0	1.9
	Kr	−		−74442	4
	Rb			−70797	7
	Sr	x		−65477	9
	Y	−		−58360	450
	Zr	x		−47360#	400#
80	Cu	x		−35500#	900#
	Zn	+		−51780	170
	Ga	+		−59070	120
	Ge			−69448	23
	As			−72118	21
	Se			−77759.4	1.9
	Br			−75888.8	1.9
	Kr			−77893	4
	Rb			−72173	7
	Sr	x		−70305	8
	Y	−	◆	−61170#	400#
	Zr	x		−55380#	300#
81	Zn	x		−46130#	400#
	Ga	+		−57980	190
	Ge	+		−66300	120
	As	+p		−72533	6
	Se	−n		−76389.1	2.0
	Br			−77974.4	2.8
	Kr			−77693.6	2.9
	Rb			−75456	6
	Sr	x		−71527	8
	Y	−		−66020	60
	Zr	−		−58860	300
	Nb	x		−47460#	400#
82	Zn	x		−42070#	400#
	Ga	x		−52950#	300#
	Ge	+		−65620	240
	As	+		−70320	200
	Se			−77593.4	2.1
	Br			−77495.9	2.8
	Kr			−80588.6	2.6
	Rb			−76189	7
	Sr			−76009	6
	Y	−		−68190	100
	Zr	−		−64190	510
	Nb	x		−52970#	300#
83	Ga	x		−49490#	500#
	Ge	x		−61000#	300#
	As	+		−69880	220
	Se	−n		−75340	4
	Br			−79009	4
	Kr			−79982	3
	Rb			−79073	6
	Sr			−76797	9
	Y	−		−72330	40
	Zr	−		−66460	100
	Nb	−		−58960	310
	Mo	x		−47750#	500#

A	Elt.	Orig.	S	Mass excess (keV)	
84	Ga	x		−44400#	600#
	Ge	x		−58400#	400#
	As	x		−66080#	300#
	Se			−75950	15
	Br			−77776	25
	Kr			−82431	3
	Rb			−79750	3
	Sr			−80644	3
	Y	−		−74160	90
	Zr	x		−71490#	200#
	Nb	x		−61880#	300#
	Mo	x		−55810#	400#
85	Ge	x		−53380#	500#
	As	x		−63520#	300#
	Se	+		−72429	30
	Br	+		−78611	19
	Kr			−81480.6	3.0
	Rb			−82167.7	2.3
	Sr			−81103	3
	Y	−		−77848	25
	Zr	−		−73150	100
	Nb	−		−67150	220
	Mo	x		−59070#	400#
	Tc	x		−47560#	500#
86	Ge	x		−50050#	600#
	As	x		−59400#	400#
	Se	+		−70541	16
	Br	+		−75640	11
	Kr			−83265.9	1.1
	Rb			−82747.3	2.3
	Sr			−84521.6	2.2
	Y	−		−79282	14
	Zr	4n		−77810	30
	Nb	−		−69830	90
	Mo	−		−64560	440
	Tc	x		−53210#	300#
87	As	x		−56280#	500#
	Se	+		−66580	40
	Br	+		−73857	18
	Kr			−80710.0	1.3
	Rb			−84595.0	2.5
	Sr			−84878.4	2.2
	Y	−		−83016.8	2.6
	Zr	+3n		−79348	8
	Nb	−		−74180	60
	Mo	−		−67690	220
	Tc	x		−59120#	300#
	Ru	x		−47340#	600#
88	As	x		−51640#	600#
	Se	+		−63880	50
	Br	+		−70730	40
	Kr			−79692	13
	Rb			−82606	4
	Sr			−87919.7	2.2
	Y	−		−84297.1	2.7
	Zr	+nn		−83624	10
	Nb	−	◆	−76420#	200#
	Mo	4n		−72701	20
	Tc	x		−62570#	300#
	Ru	x		−55500#	500#

A	Elt.	Orig.	S	Mass excess (keV)	
89	As	x		−47290#	600#
	Se	x		−59600#	300#
	Br	+		−68570	60
	Kr	+		−76720	50
	Rb			−81711	6
	Sr			−86207.0	2.2
	Y			−87702.1	2.3
	Zr			−84869	3
	Nb	p2n		−80580	40
	Mo	+3n		−75003	15
	Tc	−		−67490	210
	Ru	x		−59510#	500#
	Rh	x		−47150#	500#
90	Se	x		−56430#	400#
	Br	+		−64610	80
	Kr	+		−74963	19
	Rb			−79355	8
	Sr			−85941.9	2.7
	Y			−86487.9	2.3
	Zr			−88767.9	2.2
	Nb	−		−82657	5
	Mo	−		−80168	6
	Tc	−		−71210	240
	Ru	x		−65410#	400#
	Rh	x		−53220#	500#
91	Se	x		−50890#	500#
	Br	+		−61510	70
	Kr	+		−71310	60
	Rb			−77748	8
	Sr			−83639	6
	Y			−86346.3	2.8
	Zr			−87891.1	2.2
	Nb	−		−86638	3
	Mo	+n		−82204	11
	Tc	−		−75980	200
	Ru	εp		−68580	500
	Rh	x		−59100#	400#
	Pd	x		−47060#	600#
92	Se	x		−47200#	600#
	Br	+		−56580	50
	Kr	+		−68788	12
	Rb			−74775	7
	Sr			−82875	7
	Y			−84815	9
	Zr			−88454.6	2.1
	Nb			−86449.0	2.7
	Mo			−86805	4
	Tc	−		−78935	26
	Ru	x		−74410#	300#
	Rh	x		−63360#	400#
	Pd	x		−55500#	500#
93	Br	x		−53000#	300#
	Kr	+		−64030	100
	Rb			−72626	8
	Sr			−80088	8
	Y			−84224	11
	Zr			−87117.4	2.1
	Nb			−87208.7	2.2
	Mo			−86804	4
	Tc	−p		−83603	4
	Ru	−		−77270	90
	Rh	x		−69170#	400#
	Pd	x		−59700#	400#

A	Elt.	Orig.	S	Mass excess (keV)	
94	Br	x		−47800#	400#
	Kr	+		−61140#	300#
	Rb			−68551	9
	Sr			−78842	7
	Y			−82350	8
	Zr			−87266.3	2.3
	Nb			−86364.9	2.2
	Mo			−88410.3	1.8
	Tc	−		−84155	4
	Ru	+nn		−82568	13
	Rh	IT		−72940#	450#
	Pd	x		−66350#	400#
	Ag	x		−53300#	500#
95	Kr	x		−56040#	400#
	Rb			−65839	19
	Sr			−75117	8
	Y			−81204	8
	Zr			−85657.6	2.3
	Nb			−86782.5	1.9
	Mo			−87708.1	1.8
	Tc			−86017	5
	Ru			−83450	12
	Rh	−		−78340	150
	Pd	x		−70150#	400#
	Ag	x		−60100#	400#
96	Kr	x		−53030#	500#
	Rb			−61214	26
	Sr			−72954	25
	Y			−78341	22
	Zr			−85441	3
	Nb	+		−85604	4
	Mo			−88791.0	1.8
	Tc	−		−85818	5
	Ru			−86072	8
	Rh	−		−79626	13
	Pd	−		−76180	150
	Ag	x		−64570#	400#
	Cd	x		−56100#	500#
97	Kr	x		−47920#	500#
	Rb			−58365	28
	Sr			−68792	19
	Y			−76260	12
	Zr			−82949	3
	Nb			−85606.9	2.6
	Mo			−87540.8	1.8
	Tc			−87221	5
	Ru	−n		−86112	8
	Rh	−		−82590	40
	Pd	−		−77800	300
	Ag	x		−70790#	400#
	Cd	x		−60600#	400#
98	Rb			−54300	30
	Sr			−66629	26
	Y			−72452	24
	Zr			−81276	20
	Nb	−pn		−83526	6
	Mo			−88112.0	1.8
	Tc			−86428	4
	Ru			−88224	6
	Rh	−		−83167	12
	Pd	−pp		−81300	21
	Ag	−		−72880	150
	Cd	−		−67460#	210#
	In	x		−53800#	500#
99	Rb			−50840	150
	Sr			−62120	140
	Y			−70202	24
	Zr			−77769	20
	Nb			−82327	13
	Mo			−85966.1	1.8
	Tc			−87323.3	1.9
	Ru			−87617.0	2.0
	Rh			−85574	7
	Pd			−82188	15
	Ag	−		−76760	150
	Cd	x		−69850#	210#
	In	x		−60910#	500#
100	Rb	x		−46700#	300#
	Sr	+		−60220	130
	Y	+		−67290	80
	Zr	+		−76600	40
	Nb	+		−79939	26
	Mo			−86184	6
	Tc	−n		−86016.4	2.2
	Ru			−89218.8	2.0
	Rh	−		−85589	20
	Pd			−85227	11
	Ag			−78180	80
	Cd			−74310	100
	In			−64130	380
	Sn	−		−56860#	430#
101	Rb	+		−43600	170
	Sr	+		−55410	120
	Y	+		−64910	100
	Zr	+		−73460	30
	Nb	+		−78943	19
	Mo			−83512	6
	Tc			−86336	24
	Ru			−87949.6	2.0
	Rh	+nn		−87408	17
	Pd	−		−85428	18
	Ag	−		−81220	100
	Cd	−		−75750	150
	In	x		−68410#	300#
	Sn	x		−59560#	500#
102	Rb	x		−38000#	500#
	Sr	+		−53080	110
	Y	+		−61890	90
	Zr	+		−71740	50
	Nb	+		−76350	40
	Mo	−nn		−83558	21
	Tc			−84568	9
	Ru			−89097.9	2.0
	Rh			−86775	5
	Pd			−87926	3
	Ag	−		−81970	70
	Cd	−		−79380	70
	In	−		−70130	390
	Sn	x		−64750#	400#
103	Sr	x		−47550#	500#
	Y	x		−58740#	300#
	Zr	+		−68370	110
	Nb	+		−75320	70
	Mo	+		−80850	60
	Tc	+p		−84599	10
	Ru			−87258.9	2.0
	Rh			−88022.3	2.8
	Pd			−87479.2	2.9
	Ag			−84792	17
	Cd			−80650	15
	In	−		−74600	25
	Sn	x		−66950#	300#
	Sb	x		−55780#	500#
104	Sr	x		−44400#	700#
	Y	x		−54540#	400#
	Zr	x		−66340#	400#
	Nb	+		−72230	110
	Mo	+		−80330	60
	Tc	+		−82490	50
	Ru			−88091	4
	Rh	−n		−86950.0	2.8
	Pd			−89391	5
	Ag	−		−85112	6
	Cd	+nn		−83976	10
	In	−		−76070	140
	Sn	−		−71550	150
	Sb	+α		−59350#	360#
105	Y	x		−51150#	500#
	Zr	x		−62360#	400#
	Nb	+		−70850	100
	Mo	+		−77340	70
	Tc	+		−82290	60
	Ru			−85930	4
	Rh			−87847	5
	Pd			−88414	5
	Ag			−87068	11
	Cd			−84330	11
	In	−		−79481	17
	Sn	+α		−73220	90
	Sb	−p		−63780	150
106	Y	x		−46370#	700#
	Zr	x		−59700#	500#
	Nb	x		−66890#	300#
	Mo	+		−76257	22
	Tc	+		−79777	14
	Ru	+		−86324	8
	Rh	+		−86364	8
	Pd			−89905	5
	Ag			−86940	5
	Cd			−87134	6
	In			−80610	14
	Sn			−77430	50
	Sb	+α	◆	−66360#	310#
	Te	−α		−58030#	400#

A	Elt.	Orig.	S	Mass excess (keV)	
107	Zr	x		−55090#	600#
	Nb	x		−64920#	400#
	Mo	+		−72940	160
	Tc	+		−79100	150
	Ru	+		−83920	120
	Rh			−86861	12
	Pd			−88372	6
	Ag			−88405	6
	Cd	−		−86988	7
	In	−		−83562	13
	Sn			−78560	90
	Sb	x		−70650#	300#
	Te	$-\alpha$		−60510#	300#
108	Zr	x		−51900#	700#
	Nb	x		−60540#	500#
	Mo	+	◆	−71190#	200#
	Tc	+		−75940	130
	Ru	+		−83660	120
	Rh	+		−85020	110
	Pd			−89522	4
	Ag	−n		−87604	6
	Cd			−89253	6
	In			−84100	40
	Sn			−82000	40
	Sb	x		−72510#	210#
	Te	$-\alpha$		−65680	150
	I	−p		−52820#	360#
109	Nb	x		−58100#	500#
	Mo	x		−67250#	300#
	Tc	+	◆	−74870#	210#
	Ru	+		−80850	70
	Rh	+p		−85012	12
	Pd			−87604	4
	Ag			−88720	3
	Cd			−88505	4
	In			−86485	6
	Sn	+3n		−82636	10
	Sb	−		−76256	19
	Te			−67570	70
	I	−p		−57570	150
110	Nb	x		−53390#	600#
	Mo	x		−65460#	400#
	Tc	x		−71360#	400#
	Ru	+		−80140	230
	Rh	IT		−82950	220
	Pd			−88350	11
	Ag			−87458	3
	Cd			−90349.7	3.0
	In	−		−86472	12
	Sn	+nn		−85835	16
	Sb	−	◆	−77540#	200#
	Te	$-\alpha$		−72280	50
	I	$+\alpha$	◆	−60350#	310#
	Xe	$-\alpha$		−51720#	400#
111	Mo	x		−61000#	500#
	Tc	x		−69820#	400#
	Ru	x		−76790#	300#
	Rh	x		−82290#	210#
	Pd	+		−86030	40
	Ag	+		−88217	3
	Cd			−89254.2	3.0
	In			−88389	5
	Sn	+n		−85944	7
	Sb	−	◆	−80840#	200#
	Te	ϵp		−73480	70
	I	$-\alpha$		−64950#	300#
	Xe	$-\alpha$		−54370#	300#
112	Mo	x		−58830#	600#
	Tc	x		−65910#	500#
	Ru	+	◆	−75870#	540#
	Rh	+	◆	−79540#	500#
	Pd			−86337	18
	Ag			−86625	17
	Cd			−90581.0	2.8
	In			−87995	5
	Sn			−88659	4
	Sb	−		−81604	23
	Te			−77260	170
	I	$-\alpha$		−67100#	210#
	Xe	$-\alpha$		−59930	150
	Cs	−p		−46270#	300#
113	Mo	x		−54000#	600#
	Tc	x		−63970#	600#
	Ru	x		−72150#	500#
	Rh	x		−78790#	400#
	Pd	+		−83690	40
	Ag	+		−87033	17
	Cd			−89049.9	2.8
	In			−89366	3
	Sn			−88330	4
	Sb	−p		−84414	22
	Te	−	◆	−78310#	200#
	I	$-\alpha$		−71120	50
	Xe			−62050	90
	Cs	−p		−51660	150
114	Tc	x		−59730#	600#
	Ru	+	◆	−70790#	360#
	Rh	+	◆	−75590#	300#
	Pd			−83494	25
	Ag			−84945	26
	Cd			−90021.3	2.8
	In			−88569	3
	Sn			−90558	3
	Sb	−		−84680	200
	Te	$-\epsilon\alpha$	◆	−81920#	200#
	I	x		−72800#	300#
	Xe	$-\alpha$		−66930#	210#
	Cs	ϵp	◆	−54570#	310#
	Ba	x		−45700#	450#
115	Tc	x		−57490#	700#
	Ru	x		−66780#	600#
	Rh	+		−74400	500
	Pd	+		−80400	60
	Ag	+		−84990	30
	Cd			−88090.9	2.8
	In			−89537	4
	Sn			−90032.6	3.0
	Sb	−		−87003	20
	Te	IT		−82360	110
	I	2p−n	◆	−76460#	470#
	Xe	ϵp	◆	−68430#	240#
	Cs	$-\alpha$		−59670#	430#
	Ba	x		−48710#	600#
116	Ru	x		−65060#	700#
	Rh	+	◆	−71060#	500#
	Pd	+		−79960	60
	Ag	+		−82570	50
	Cd			−88720	3
	In	−n		−88250	4
	Sn			−91524.7	3.0
	Sb			−86818	6
	Te			−85310	90
	I	−		−77560	140
	Xe	−	◆	−72900#	250#
	Cs			−62490	350
	Ba	x		−54330#	500#
117	Ru	x		−60740#	800#
	Rh	x		−69540#	600#
	Pd	x		−76530#	300#
	Ag	+		−82270	50
	Cd	−n		−86426	3
	In			−88943	6
	Sn			−90398.0	2.9
	Sb			−88641	9
	Te			−85107	19
	I			−80440	70
	Xe			−73990	180
	Cs	IT		−66470	50
	Ba	ϵp	◆	−56950#	650#
	La	x		−46570#	890#
118	Ru	x		−58660#	900#
	Rh	x		−65740#	700#
	Pd	+		−75470	210
	Ag	+		−79570	60
	Cd	−nn		−86709	20
	In			−87230	8
	Sn			−91653.1	2.9
	Sb	−		−87996	4
	Te			−87723	16
	I			−80690	80
	Xe	+		−77710	1000
	Cs	IT		−68414	13
	Ba	x		−62000#	500#
	La	x		−49770#	800#

A	Elt.	Orig.	S	Mass excess (keV)	
119	Rh	x		−63940#	800#
	Pd	x		−72020#	300#
	Ag	+		−78560	90
	Cd	+		−83910	80
	In			−87704	8
	Sn			−90067.2	2.8
	Sb			−89473	8
	Te			−87180	8
	I			−83670	60
	Xe			−78660	120
	Cs			−72311	14
	Ba	ϵp		−64220	1020
	La	x		−54970#	700#
	Ce	x		−44000#	900#
120	Rh	x		−59820#	800#
	Pd	x		−70770#	400#
	Ag	+		−75650	70
	Cd	+α		−83973	19
	In	+		−85730	40
	Sn			−91103.3	2.5
	Sb	−		−88423	8
	Te			−89405	10
	I	−		−83790	18
	Xe	−		−81830	40
	Cs			−73888	10
	Ba	−		−68890	300
	La	x		−57690#	600#
	Ce	x		−49710#	800#
121	Rh	x		−57680#	900#
	Pd	x		−66900#	500#
	Ag	+		−74660	150
	Cd	+		−81060	80
	In	+p		−85838	27
	Sn			−89202.8	2.5
	Sb			−89592.9	2.3
	Te			−88557	25
	I			−86288	11
	Xe	+		−82543	24
	Cs	IT		−77143	14
	Ba	ϵp		−70340	300
	La	x		−62400#	500#
	Ce	x		−52470#	700#
	Pr	−p		−41580#	800#
122	Pd	x		−65390#	500#
	Ag	x		−71430#	210#
	Cd	x		−80570#	210#
	In	+		−83580	50
	Sn			−89944.9	2.7
	Sb			−88328.5	2.2
	Te			−90311.1	1.9
	I	−		−86077	5
	Xe	+		−85190	90
	Cs			−78132	16
	Ba	x		−74280#	300#
	La	x		−64540#	500#
	Ce	x		−57740#	600#
	Pr	x		−45040#	800#
123	Pd	x		−61240#	600#
	Ag	x		−69960#	300#
	Cd	+		−77310	40
	In	+		−83426	24
	Sn			−87819.5	2.7
	Sb			−89222.5	2.0
	Te			−89169.2	1.8
	I			−87935	4
	Xe	−		−85259	15
	Cs			−81049	12
	Ba	x		−75590#	300#
	La	x		−68710#	400#
	Ce	x		−60070#	500#
	Pr	x		−50340#	700#
124	Ag	x		−66570#	400#
	Cd	+		−76710	60
	In	+		−80880	50
	Sn			−88236.1	1.4
	Sb			−87618.6	2.0
	Te			−90523.1	1.5
	I	−		−87363.5	2.4
	Xe			−87657.5	2.0
	Cs			−81743	12
	Ba	x		−79095	14
	La	x		−70300#	300#
	Ce	x		−64720#	500#
	Pr	x		−53130#	600#
125	Ag	x		−64700#	400#
	Cd	+		−73360	70
	In	+		−80480	30
	Sn	−n		−85897.8	1.5
	Sb	+		−88261.1	2.8
	Te			−89027.8	1.9
	I	−		−88842.0	1.9
	Xe			−87189.5	2.0
	Cs			−84091	8
	Ba	−		−79530	250
	La	x		−73900#	300#
	Ce	x		−66570#	400#
	Pr	x		−57910#	500#
126	Ag	x		−61010#	400#
	Cd	+		−72330	50
	In	+		−77810	40
	Sn	−nn		−86020	11
	Sb	−		−86400	30
	Te			−90070.3	1.9
	I			−87915	4
	Xe	−		−89173	6
	Cs			−84349	12
	Ba	x		−82676	14
	La	x		−75110#	300#
	Ce	x		−70700#	400#
	Pr	x		−60260#	500#
	Nd	x		−53030#	700#
127	Ag	x		−58800#	500#
	Cd	+		−68530	70
	In	+		−76990	40
	Sn	+		−83508	25
	Sb	+		−86709	6
	Te			−88290	3
	I			−88987	4
	Xe			−88325	4
	Cs			−86240	9
	Ba	−		−82790	100
	La	x		−78100#	220#
	Ce	x		−71960#	300#
	Pr	x		−64430#	400#
	Nd	x		−55420#	600#
128	Cd	+		−67290	290
	In	+		−74360	50
	Sn	+		−83336	27
	Sb	IT		−84610	25
	Te			−88993.6	1.8
	I			−87742	4
	Xe			−89860.8	1.4
	Cs			−85932	6
	Ba			−85410	11
	La	−		−78760	400
	Ce	x		−75570#	300#
	Pr	x		−66320#	400#
	Nd	x		−60180#	600#
	Pm	x		−48200#	900#
129	Cd	x		−63100#	400#
	In	+		−72980	130
	Sn	+		−80630	120
	Sb	+		−84626	21
	Te			−87006	3
	I			−88504	3
	Xe			−88697.4	0.8
	Cs			−87501	5
	Ba			−85070	11
	La	−		−81350	50
	Ce	−	◆	−76300#	210#
	Pr	x		−69990#	300#
	Nd	ϵp	◆	−62170#	360#
	Pm	x		−52950#	800#
130	Cd	x		−61500#	400#
	In	+		−70000	50
	Sn	+		−80246	29
	Sb	+		−82394	25
	Te			−87352.9	1.9
	I			−86933	3
	Xe			−89881.8	0.9
	Cs			−86903	8
	Ba			−87271	7
	La	x		−81670#	210#
	Ce	2p−n	◆	−79460#	610#
	Pr	x		−71370#	300#
	Nd	x		−66340#	500#
	Pm	x		−55470#	700#
	Sm	x		−47850#	900#

A	Elt.	Orig.	S	Mass excess (keV)	
131	In	+		−68220	80
	Sn	+		−77390	70
	Sb	+		−82020	70
	Te	−n		−85211.3	2.0
	I	+		−87444.8	1.1
	Xe			−88415.6	1.0
	Cs			−88063	5
	Ba			−86693	7
	La	−		−83730	100
	Ce	−		−79710	410
	Pr	−		−74460	440
	Nd	−		−67900	460
	Pm	x		−59800#	600#
	Sm	x		−50400#	900#
132	In	+		−62490	70
	Sn	+		−76621	26
	Sb	+		−79724	23
	Te	+		−85210	11
	I	+		−85703	11
	Xe			−89279.5	1.1
	Cs			−87160	3
	Ba			−88440	3
	La	−		−83730	40
	Ce	x		−82450#	200#
	Pr	x		−75340#	200#
	Nd	x		−71610#	300#
	Pm	x		−61710#	500#
	Sm	x		−55130#	700#
	Eu	x		−42700#	900#
133	In	x		−57440#	400#
	Sn	+		−70970	80
	Sb	+		−78960	80
	Te	+		−82960	80
	I	+		−85878	26
	Xe	+		−87648	4
	Cs			−88075.7	3.0
	Ba			−87558	3
	La	−		−85330	200
	Ce	x		−82390#	200#
	Pr	x		−78060#	200#
	Nd	x		−72460#	300#
	Pm	x		−65470#	500#
	Sm	x		−57070#	600#
	Eu	x		−47600#	900#
134	In	x		−51550#	500#
	Sn	+		−66640	100
	Sb	+		−74010	50
	Te	+		−82400	30
	I	+		−83949	15
	Xe			−88124.4	0.8
	Cs			−86895.9	3.0
	Ba			−88954.5	3.0
	La	−		−85241	26
	Ce	−		−84740	200
	Pr	IT		−78550#	300#
	Nd	−		−75780#	330#
	Pm	−		−66610#	390#
	Sm	x		−61460#	500#
	Eu	x		−50000#	700#
135	Sn	x		−60800#	400#
	Sb	+		−69710	110
	Te	+		−77830	90
	I			−83788	23
	Xe			−86436	10
	Cs			−87587	3
	Ba			−87855.9	3.0
	La	−		−86656	10
	Ce	−		−84630	11
	Pr	−		−80910	150
	Nd	x		−76160#	210#
	Pm	IT		−70220#	320#
	Sm	x		−63020#	500#
	Eu	x		−54290#	600#
136	Sn	x		−56500#	500#
	Sb	x		−64590#	300#
	Te			−74420	50
	I			−79500	50
	Xe			−86424	7
	Cs	+		−86344	4
	Ba			−88892.4	3.0
	La	−		−86020	70
	Ce	+nn		−86500	50
	Pr	−		−81370	50
	Nd	−		−79160	60
	Pm	−		−71310	210
	Sm	x		−66790#	400#
	Eu	x		−56360#	500#
	Gd	x		−49300#	700#
137	Sn	x		−50500#	600#
	Sb	x		−60260#	400#
	Te	+		−69560	120
	I	p−2n		−76501	28
	Xe	−n		−82379	7
	Cs			−86551.1	3.0
	Ba			−87726.8	3.0
	La	+		−87130	50
	Ce	−n		−85900	50
	Pr	−		−83200	50
	Nd	−		−79510	70
	Pm	IT		−73860#	140#
	Sm	−		−67960	110
	Eu	x		−60350#	500#
	Gd	x		−51560#	600#
138	Sb	x		−55000#	500#
	Te	x		−65930#	210#
	I	+		−72300	80
	Xe	+		−80120	40
	Cs			−82893	10
	Ba			−88267.2	3.0
	La	+n		−86529	4
	Ce			−87574	11
	Pr	−		−83137	15
	Nd	−	◆	−82040#	200#
	Pm	−	◆	−75040#	320#
	Sm	x		−71220#	300#
	Eu	x		−61990#	400#
	Gd	x		−55920#	500#
	Tb	x		−43900#	800#
139	Sb	x		−50570#	600#
	Te	x		−60800#	400#
	I	+		−68840	30
	Xe	+		−75650	21
	Cs			−80707	4
	Ba			−84919.3	3.0
	La			−87236	3
	Ce	−		−86958	8
	Pr	−		−84829	8
	Nd	−		−82040	50
	Pm	−		−77540	60
	Sm	x		−72375	15
	Eu	−	◆	−65360#	150#
	Gd	x		−57680#	500#
	Tb	x		−48410#	700#
140	Te	x		−57100#	500#
	I	x		−64080#	210#
	Xe	+		−73000	60
	Cs			−77056	9
	Ba			−83276	8
	La			−84326	3
	Ce			−88088	3
	Pr	−		−84700	7
	Nd	+nn		−84477	19
	Pm	−		−78430	30
	Sm	x		−75459	15
	Eu	−		−66990	50
	Gd	−	◆	−61530#	400#
	Tb	−	◆	−50730#	900#
	Dy	x		−43040#	900#
141	Te	x		−51800#	500#
	I	x		−60710#	300#
	Xe	+		−68330	90
	Cs			−74479	10
	Ba			−79730	8
	La			−82943	5
	Ce			−85445	3
	Pr			−86026	3
	Nd			−84203	4
	Pm			−80475	27
	Sm			−75946	12
	Eu	−		−69968	28
	Gd	x		−63150#	300#
	Tb	x		−54810#	600#
	Dy	x		−45470#	700#
142	Te	x		−47970#	600#
	I	x		−55720#	400#
	Xe	+		−65480	100
	Cs			−70521	11
	Ba			−77828	6
	La			−80039	6
	Ce			−84543	3
	Pr			−83797	3
	Nd			−85959.5	2.8
	Pm	−		−81090	40
	Sm			−78997	11
	Eu	−		−71350	30
	Gd	−	◆	−66850#	300#
	Tb	−	◆	−56950#	760#
	Dy	−	◆	−50050#	790#
	Ho	x		−37390#	1000#

A	Elt.	Orig.	S	Mass excess (keV)	
143	I	x		−52100#	400#
	Xe	x		−60650#	220#
	Cs			−67691	22
	Ba			−73945	13
	La			−78191	15
	Ce			−81616	3
	Pr			−83078	3
	Nd			−84011.8	2.8
	Pm			−82970	4
	Sm			−79528	4
	Eu			−74253	13
	Gd	−		−68240	200
	Tb	x		−60780#	400#
	Dy	x		−52320#	500#
	Ho	x		−42210#	700#
144	I	x		−46940#	500#
	Xe	x		−57540#	320#
	Cs			−63316	28
	Ba			−71780	14
	La			−74900	60
	Ce			−80441	4
	Pr			−80760	4
	Nd			−83757.5	2.8
	Pm			−81426	4
	Sm			−81976	3
	Eu	−		−75661	18
	Gd	−	◆	−71920#	200#
	Tb	x		−62850#	300#
	Dy	x		−56760#	400#
	Ho	x		−45050#	600#
	Er	x		−36710#	800#
145	Xe	x		−52470#	400#
	Cs			−60190	50
	Ba			−68070	60
	La			−72990	70
	Ce			−77100	40
	Pr			−79636	8
	Nd			−81441.6	2.8
	Pm			−81279	4
	Sm			−80662	3
	Eu			−78002	4
	Gd	−		−72950	40
	Tb	IT		−66250#	230#
	Dy	−	◆	−58730#	300#
	Ho	x		−49480#	600#
	Er	x		−39630#	700#
146	Xe	x		−49090#	400#
	Cs			−55740	80
	Ba			−65110	80
	La			−69210	70
	Ce			−75740	70
	Pr			−76770	60
	Nd			−80935.5	2.8
	Pm	+		−79464	5
	Sm			−81006	4
	Eu			−77128	7
	Gd	+nn		−76098	5
	Tb	−		−67830	50
	Dy	−		−62670	110
	Ho	x		−52070#	500#
	Er	x		−44600#	600#
	Tm	−p		−31210#	700#
147	Xe	x		−43770#	500#
	Cs			−52290	150
	Ba	+		−61490	90
	La	+		−67240	80
	Ce	+		−72180	50
	Pr	+		−75470	40
	Nd			−78156.3	2.8
	Pm			−79052.3	2.9
	Sm			−79276.4	2.9
	Eu			−77555	4
	Gd			−75368	4
	Tb			−70759	12
	Dy	−		−64390	50
	Ho	x		−56040#	400#
	Er	x		−47220#	500#
	Tm	−p		−36250#	600#
148	Cs			−47600	590
	Ba	+		−58050	140
	La	+		−63160	130
	Ce	+		−70430	120
	Pr	+		−72490	90
	Nd			−77418	3
	Pm	+p		−76878	7
	Sm			−79346.6	2.9
	Eu	−		−76239	18
	Gd			−76280	3
	Tb	−		−70520	30
	Dy	−		−67830	30
	Ho	IT		−58430#	270#
	Er	x		−51750#	400#
	Tm	x		−39540#	700#
	Yb	x		−30960#	800#
149	Cs	x		−44040#	300#
	Ba	x		−53600#	400#
	La	x		−61130#	300#
	Ce	+		−66800	80
	Pr	+p		−70988	11
	Nd			−74385	3
	Pm			−76076	4
	Sm			−77146.8	2.9
	Eu			−76451	5
	Gd			−75138	4
	Tb			−71500	5
	Dy	−		−67688	11
	Ho	−		−61674	22
	Er	ϵp	◆	−53860#	470#
	Tm	x		−44110#	600#
	Yb	x		−34020#	700#
150	Cs	x		−39150#	500#
	Ba	x		−50660#	500#
	La	x		−57220#	400#
	Ce	+		−64990	120
	Pr	+		−68000	80
	Nd			−73694	4
	Pm	+		−73607	20
	Sm			−77061.1	2.9
	Eu			−74801	7
	Gd			−75772	7
	Tb			−71116	8
	Dy	−α		−69322	5
	Ho	−	◆	−62080#	100#
	Er	−	◆	−57970#	100#
	Tm	x		−46880#	500#
	Yb	x		−39130#	600#
	Lu	−p		−25460#	700#
151	Cs	x		−35400#	700#
	Ba	x		−45920#	600#
	La	x		−54440#	500#
	Ce	x		−61440#	300#
	Pr	+		−66860	40
	Nd	−n		−70957	4
	Pm			−73399	6
	Sm			−74586.2	2.9
	Eu			−74662.9	2.9
	Gd			−74199	4
	Tb			−71634	5
	Dy	−α		−68763	4
	Ho			−63639	12
	Er	x		−58260#	300#
	Tm	IT	◆	−50830#	140#
	Yb	ϵp	◆	−41690#	320#
	Lu	IT		−30600#	600#
152	Ba	x		−42700#	700#
	La	x		−50200#	600#
	Ce	x		−59260#	400#
	Pr	x		−63710#	300#
	Nd	−nn		−70160	30
	Pm	+		−71270	70
	Sm			−74772.6	2.9
	Eu			−72898.3	2.9
	Gd			−74717.1	3.0
	Tb	−		−70730	40
	Dy	−α		−70129	5
	Ho	−α		−63580	30
	Er	−α		−60470	30
	Tm	x		−51880#	300#
	Yb	−		−46420#	360#
	Lu	x		−33900#	700#
153	Ba	x		−37620#	900#
	La	x		−47090#	700#
	Ce	x		−55350#	500#
	Pr	x		−61810#	300#
	Nd	+		−67352	27
	Pm			−70688	11
	Sm			−72569.0	2.9
	Eu			−73377.3	2.9
	Gd			−72892.9	3.0
	Tb			−71324	5
	Dy			−69153	5
	Ho	−α		−65023	6
	Er	−α		−60460	11
	Tm	−α		−54001	22
	Yb	x		−47310#	300#
	Lu	x		−38480#	600#
154	La	x		−42480#	800#
	Ce	x		−52800#	600#
	Pr	x		−58320#	400#
	Nd	+		−65690	110
	Pm	+		−68420	70
	Sm			−72465.3	3.0
	Eu			−71748.0	2.9
	Gd			−73716.3	2.9
	Tb	−		−70150	50
	Dy	−α		−70400	9
	Ho	−α		−64649	9
	Er	−α		−62618	6
	Tm	−α	◆	−54560#	110#
	Yb	−α	◆	−50080#	100#
	Lu	x		−39960#	500#
	Hf	x		−33300#	700#

A	Elt.	Orig.	S	Mass excess (keV)	
155	La	x		−39000#	900#
	Ce	x		−48400#	700#
	Pr	x		−55900#	500#
	Nd	+		−62760	150
	Pm	+		−66980	30
	Sm	−n		−70201.2	3.0
	Eu			−71828.0	2.9
	Gd			−72080.1	2.9
	Tb	+		−71259	12
	Dy	+n		−69164	12
	Ho	−		−66062	23
	Er	−α		−62220	50
	Tm			−56643	13
	Yb	−α		−50490#	300#
	Lu	+α	◆	−42630#	130#
	Hf	x		−34690#	600#
156	Ce	x		−45400#	800#
	Pr	x		−52050#	600#
	Nd	x		−60360#	400#
	Pm	+		−64220	40
	Sm			−69372	10
	Eu			−70094	6
	Gd			−72545.2	2.9
	Tb			−70101	5
	Dy			−70534	7
	Ho	−	◆	−65470#	200#
	Er	+		−64260	70
	Tm	−α		−56810	60
	Yb	−α		−53240	30
	Lu	−α		−43870#	300#
	Hf	−α		−37960#	360#
	Ta	−p		−26370#	600#
157	Ce	x		−40670#	900#
	Pr	x		−49210#	700#
	Nd	x		−56570#	500#
	Pm	x		−62220#	300#
	Sm	+		−66740	50
	Eu			−69471	6
	Gd			−70833.9	3.0
	Tb			−70773.8	3.0
	Dy			−69432	7
	Ho	−		−66890	50
	Er	−		−63390	80
	Tm	−		−58910	110
	Yb	−α		−53410	50
	Lu	IT		−46480	22
	Hf	−α		−39000#	300#
	Ta	−α		−29670#	600#
158	Pr	x		−44920#	800#
	Nd	x		−54150#	600#
	Pm	x		−58970#	400#
	Sm	+		−65220	80
	Eu	+		−67210	80
	Gd			−70699.9	3.0
	Tb			−69479.9	3.0
	Dy			−70417	4
	Ho	−		−66190	30
	Er	−		−65290#	100#
	Tm	−		−58690#	120#
	Yb	−α		−56022	10
	Lu	−α	◆	−47350#	120#
	Hf	−α	◆	−42250#	100#
	Ta	−α		−31330#	510#
	W	−α		−24280#	700#
159	Pr	x		−41700#	900#
	Nd	x		−49940#	700#
	Pm	x		−56700#	500#
	Sm	x		−62220#	300#
	Eu			−66057	8
	Gd			−68571.9	3.0
	Tb			−69542.4	3.0
	Dy			−69177	3
	Ho			−67339	4
	Er			−64570	5
	Tm			−60730	70
	Yb			−55750	90
	Lu			−49730	50
	Hf	−α		−42850#	300#
	Ta	+α	◆	−34550#	120#
	W	−α		−25820#	600#
160	Nd	x		−47140#	800#
	Pm	x		−53100#	600#
	Sm	x		−60420#	400#
	Eu	+	◆	−63370#	200#
	Gd			−67951.9	3.0
	Tb			−67846.3	3.0
	Dy			−69682	3
	Ho	−		−66392	15
	Er	+nn		−66060	50
	Tm	−		−60460	300
	Yb	− −		−58160#	210#
	Lu	−	◆	−50280#	230#
	Hf	−α		−45910	30
	Ta	−α		−36000#	310#
	W	−α		−29460#	360#
	Re	−α		−17250#	600#
161	Nd	x		−42540#	900#
	Pm	x		−50430#	700#
	Sm	x		−56980#	500#
	Eu	x		−61780#	300#
	Gd	−n		−65516	3
	Tb			−67472	3
	Dy			−68065	3
	Ho			−67206	4
	Er	+n		−65203	10
	Tm	−		−62040	90
	Yb	−	◆	−57890#	220#
	Lu	−	◆	−52590#	240#
	Hf	−α		−46270	70
	Ta	−α		−38780	50
	W	−α		−30660#	310#
	Re	−α		−20810#	600#
162	Pm	x		−46310#	800#
	Sm	x		−54750#	600#
	Eu	x		−58650#	400#
	Gd	−nn		−64291	5
	Tb	+		−65680	40
	Dy			−68190	3
	Ho			−66050	4
	Er			−66346	4
	Tm	−		−61510	30
	Yb	x		−59850#	210#
	Lu	−		−52890#	220#
	Hf	−α		−49180	11
	Ta	−α	◆	−39920#	130#
	W	−α	◆	−34150#	100#
	Re	−α		−22630#	510#
	Os	−α		−15070#	700#
163	Pm	x		−43300#	900#
	Sm	x		−50900#	700#
	Eu	x		−56630#	500#
	Gd	x		−61490#	300#
	Tb	+p		−64605	5
	Dy			−66390	3
	Ho			−66387	3
	Er			−65177	5
	Tm	−		−62738	6
	Yb	−		−59370	100
	Lu	−		−54770	220
	Hf	+α		−49320#	320#
	Ta	−α		−42550	70
	W	−α		−34900#	310#
	Re	+α	◆	−26110#	110#
	Os	−α		−16720#	600#
164	Sm	x		−48180#	800#
	Eu	x		−53100#	600#
	Gd	x		−59750#	400#
	Tb	+		−62090	100
	Dy			−65977	3
	Ho			−64990	3
	Er			−65953	3
	Tm	−		−61990	19
	Yb	x		−60990#	100#
	Lu	−		−54760#	130#
	Hf	+α		−51770#	200#
	Ta	x		−43250#	400#
	W	−α		−38210	30
	Re	−α		−27650#	310#
	Os	−α		−20560#	360#
165	Sm	x		−43800#	900#
	Eu	x		−50560#	700#
	Gd	x		−56470#	500#
	Tb	x		−60660#	200#
	Dy	−n		−63621	3
	Ho			−64907.3	3.0
	Er			−64531	3
	Tm			−62939	4
	Yb	−		−60177	20
	Lu	−		−56260	80
	Hf	+α		−51660#	370#
	Ta	+α		−45810#	220#
	W	−α		−38810	90
	Re	−α		−30690	70
	Os	−α		−21910#	310#
	Ir	x		−11570#	400#
166	Eu	x		−46600#	800#
	Gd	x		−54400#	600#
	Tb	x		−57710#	300#
	Dy	−n		−62593	3
	Ho			−63079.6	3.0
	Er			−64934.5	2.9
	Tm	−		−61895	11
	Yb	+nn		−61591	8
	Lu	−		−56110	160
	Hf	x		−53790#	300#
	Ta	x		−46140#	300#
	W	−α		−41899	12
	Re	−α	◆	−31860#	140#
	Os	−α	◆	−25590#	100#
	Ir	−α		−13500#	510#

A	Elt.	Orig.	S	Mass excess (keV)	
167	Eu	x		−43730#	900#
	Gd	x		−50700#	600#
	Tb	x		−55840#	400#
	Dy	+		−59940	60
	Ho	p2n		−62293	6
	Er			−63299.2	2.9
	Tm			−62551	3
	Yb			−60597	5
	Lu	−		−57470	100
	Hf	x		−53470#	210#
	Ta	+	◆	−48460#	430#
	W	+α		−42220#	310#
	Re	IT		−34870#	130#
	Os	−α		−26500#	310#
	Ir	−p	◆	−17190#	100#
168	Gd	x		−48100#	700#
	Tb	x		−52500#	500#
	Dy	x		−58470#	300#
	Ho	+		−60085	29
	Er			−62999.0	2.9
	Tm			−61320	3
	Yb			−61577	4
	Lu	−		−57100	80
	Hf	x		−55300#	100#
	Ta	+α		−48640#	370#
	W	+α		−44840#	200#
	Re	−α		−35760#	400#
	Os	−α		−29960	30
	Ir	−α		−18660#	330#
	Pt	−α		−11150#	360#
169	Gd	x		−43900#	800#
	Tb	x		−50100#	600#
	Dy	+		−55610	300
	Ho	+p		−58807	20
	Er			−60930.8	2.9
	Tm			−61281.9	2.9
	Yb			−60373	4
	Lu	−		−58080	5
	Hf	−		−54810	80
	Ta	x		−50380#	210#
	W	+α		−44940#	320#
	Re	x		−38350#	210#
	Os	−α		−30670	90
	Ir	−α		−21990	90
	Pt	−α		−12650#	310#
170	Tb	x		−46340#	700#
	Dy	x		−53400#	400#
	Ho	+		−56250	50
	Er			−60118	3
	Tm			−59803.9	2.9
	Yb			−60771.9	2.9
	Lu	−		−57313	19
	Hf	x		−56220#	200#
	Ta	x		−50220#	200#
	W	+α	◆	−47240#	470#
	Re	+α		−38970#	400#
	Os	−α		−33935	13
	Ir	−α	◆	−23260#	150#
	Pt	−α	◆	−16460#	100#
171	Tb	x		−43500#	800#
	Dy	x		−49850#	500#
	Ho	+		−54530	600
	Er			−57729	3
	Tm			−59219.0	2.9
	Yb			−59315.4	2.8
	Lu			−57837	3
	Hf	x		−55430#	200#
	Ta	x		−51740#	210#
	W	x		−47080#	280#
	Re	−		−41410#	340#
	Os	+α		−34430#	310#
	Ir	−α		−26290#	130#
	Pt	−α		−17470#	310#
	Au	IT	◆	−7660#	250#
172	Dy	x		−47400#	600#
	Ho	x		−51400#	400#
	Er			−56493	5
	Tm			−57384	6
	Yb			−59263.8	2.8
	Lu			−56745	3
	Hf	−		−56390	50
	Ta	−		−51470	190
	W	−	◆	−48980#	270#
	Re	+α		−41650#	310#
	Os	+α		−37190#	200#
	Ir	−α		−27350#	400#
	Pt	−α		−21070	30
	Au	−α		−9210#	330#
173	Dy	x		−43370#	700#
	Ho	x		−49100#	400#
	Er	x		−53650#	200#
	Tm	p2n		−56262	5
	Yb			−57560.0	2.8
	Lu			−56889.2	2.8
	Hf	x		−55280#	100#
	Ta	−	◆	−52590#	230#
	W	−	◆	−48590#	380#
	Re	+α		−43720#	450#
	Os	+α		−37450#	310#
	Ir	−α		−30080#	230#
	Pt	−α		−21890	100
	Au	−α		−12670	100
174	Ho	x		−45500#	500#
	Er	x		−51850#	300#
	Tm	+		−53870	40
	Yb			−56953.3	2.8
	Lu			−55579.0	2.8
	Hf			−55852	3
	Ta	−		−52010	80
	W	x		−50150#	300#
	Re	+α	◆	−43680#	410#
	Os	+α	◆	−39940#	470#
	Ir	+α		−30920#	400#
	Pt	−α		−25326	13
	Au	−α	◆	−14050#	150#
175	Ho	x		−42800#	600#
	Er	x		−48500#	400#
	Tm	+		−52320	50
	Yb			−54704.3	2.8
	Lu			−55174.3	2.6
	Hf			−54490	3
	Ta	x		−52490#	100#
	W	x		−49580#	200#
	Re	+α		−45280#	450#
	Os	+α		−39980#	300#
	Ir	−α		−33270#	340#
	Pt	+α		−25830#	310#
	Au	IT		−17190#	240#
	Hg	−α		−8000#	320#
176	Er	x		−46310#	400#
	Tm	+		−49380	100
	Yb			−53497.2	2.9
	Lu			−53391.0	2.6
	Hf			−54583.8	2.7
	Ta	−		−51470	100
	W	x		−50680#	200#
	Re	x		−45110#	200#
	Os	+α	◆	−41960#	200#
	Ir	+α		−33990#	300#
	Pt	x		−28880#	200#
	Au	−α		−18380#	400#
	Hg	−α		−11720	40
177	Er	x		−42500#	600#
	Tm	x		−47470#	300#
	Yb	−n		−50993	3
	Lu			−52391.9	2.6
	Hf			−52890.2	2.5
	Ta	−		−51724	4
	W	x		−49720#	300#
	Re	x		−46320#	200#
	Os	+α		−41880#	280#
	Ir	+α		−36170#	450#
	Pt	+α		−29390#	310#
	Au	−α		−21220#	230#
	Hg	−α		−12730	110
	Tl	−α		−2910#	230#
178	Tm	x		−44120#	400#
	Yb	−nn		−49701	10
	Lu			−50346	3
	Hf			−52445.2	2.5
	Ta	IT		−50530	100
	W	−		−50440	100
	Re	−		−45780	210
	Os	+α		−43460	200
	Ir	+α	◆	−36250#	360#
	Pt	+α	◆	−31940#	470#
	Au	+α		−22380#	400#
	Hg	−α		−16323	15
	Tl	−α	◆	−4450#	210#

A	Elt.	Orig.	S	Mass excess (keV)	
179	Tm	x		−41600#	500#
	Yb	x		−46420#	300#
	Lu			−49067	6
	Hf			−50472.9	2.5
	Ta	+nn		−50362	6
	W	+n		−49302	16
	Re	−		−46590	50
	Os	+α		−42890#	230#
	Ir	+α		−38050#	400#
	Pt	+α		−32160#	300#
	Au	−α		−24770#	340#
	Hg	+α		−16970#	310#
	Tl	−α		−7950#	140#
180	Yb	x		−44400#	400#
	Lu	+		−46690	70
	Hf			−49789.5	2.5
	Ta			−48935	3
	W			−49643	5
	Re	−		−45840	30
	Os	+α	◆	−44390#	180#
	Ir	+α	◆	−37960#	190#
	Pt	+α	◆	−34270#	200#
	Au	+α		−25710#	300#
	Hg	−α		−20190#	200#
	Tl	−α		−9140#	450#
181	Yb	x		−40850#	400#
	Lu	x		−44740#	300#
	Hf			−47413.9	2.6
	Ta			−48441.1	2.9
	W			−48253	5
	Re	4n		−46515	14
	Os	−		−43520	200
	Ir	+α		−39460	210
	Pt	+α		−34300#	280#
	Au	+α		−27990#	450#
	Hg	+α		−20670#	310#
	Tl	−α		−12200#	380#
	Pb	IT		−3060#	160#
182	Lu	x		−41720#	300#
	Hf	−nn		−46060	7
	Ta			−46432.7	2.9
	W			−48246.2	2.9
	Re	IT		−45450	100
	Os			−44538	25
	Ir			−39000	140
	Pt			−36080	200
	Au	−	◆	−28300#	360#
	Hg	−	◆	−23520#	470#
	Tl	x		−13400#	400#
	Pb	−α		−6822	17
183	Lu	x		−39520#	300#
	Hf	+		−43290	30
	Ta	−n		−45295.6	2.9
	W			−46365.6	2.7
	Re	−		−45810	8
	Os	x		−43680#	100#
	Ir	−		−40230#	140#
	Pt	+α		−35650#	230#
	Au	IT		−30160#	400#
	Hg	+α		−23700#	300#
	Tl	+α		−16120#	390#
	Pb	x		−7520#	310#
184	Lu	x		−36170#	400#
	Hf	+		−41500	40
	Ta	+		−42840	26
	W			−45706.0	2.7
	Re			−44223	5
	Os			−44254.5	3.0
	Ir	−		−39690	270
	Pt	+α	◆	−37360#	180#
	Au	−	◆	−30300#	190#
	Hg	−	◆	−26180#	200#
	Tl	x		−16990#	300#
	Pb	−α		−10990#	200#
185	Hf	x		−38400#	300#
	Ta	+		−41396	14
	W			−43388.4	2.8
	Re			−43821.4	2.8
	Os			−42808.6	2.8
	Ir	x		−40440#	200#
	Pt	−α		−36560	210
	Au	−		−31850	210
	Hg	+α		−26100#	280#
	Tl	x		−19470#	400#
	Pb	x		−11570#	310#
	Bi	IT		−2140#	230#
186	Hf	x		−36400#	300#
	Ta	+		−38610	60
	W			−42511.3	2.9
	Re			−41929.8	2.8
	Os			−42999.3	2.9
	Ir	−		−39168	20
	Pt			−37790	30
	Au			−31670	140
	Hg			−28450	200
	Tl	−α	◆	−19980#	370#
	Pb	−α	◆	−14620#	470#
	Bi	−α		−3280#	450#
187	Ta	x		−36880#	300#
	W			−39906.7	2.9
	Re			−41217.9	2.8
	Os			−41220.5	2.8
	Ir	−		−39718	7
	Pt	+	◆	−36740#	180#
	Au	−α		−33010#	150#
	Hg	IT		−28150#	240#
	Tl	x		−22200#	400#
	Pb	x		−14880#	300#
	Bi	−α		−6090#	380#
188	Ta	x		−33800#	300#
	W	+		−38669	4
	Re	−n		−39018.1	2.8
	Os			−41138.5	2.8
	Ir			−38329	7
	Pt			−37823	6
	Au	−	◆	−32520#	100#
	Hg	−	◆	−30220#	180#
	Tl	x		−22430#	220#
	Pb	−α	◆	−17640#	200#
	Bi	−α		−7290#	300#
189	W	+		−35480	200
	Re	+p		−37979	9
	Os			−38987.8	2.8
	Ir			−38455	13
	Pt			−36485	11
	Au	−	◆	−33640#	200#
	Hg	−	◆	−29690#	280#
	Tl	+α	◆	−24510#	350#
	Pb	x		−17810#	270#
	Bi	−α		−9780#	400#
190	W	+		−34300	220
	Re	+		−35570	210
	Os			−38708.0	2.8
	Ir	−		−36710	200
	Pt			−37325	6
	Au	−		−32883	16
	Hg	−	◆	−31410#	150#
	Tl	−	◆	−24410#	430#
	Pb	−α		−20330	200
	Bi	−α	◆	−10700#	370#
	Po	−α	◆	−4560#	470#
191	Re	+p		−34350	11
	Os			−36395.4	2.8
	Ir			−36709.1	2.9
	Pt			−35691	5
	Au	−		−33860	50
	Hg	−		−30680	90
	Tl	+α	◆	−26190#	220#
	Pb	x		−20310#	210#
	Bi	−α		−12990#	400#
	Po	−α		−4980#	300#
192	Re	x		−31710#	200#
	Os			−35882	3
	Ir			−34835.8	2.9
	Pt			−36296	3
	Au	−		−32779	16
	Hg	+	◆	−32070#	280#
	Tl	−−	◆	−25950#	200#
	Pb	−α	◆	−22580#	180#
	Bi	−α		−13630#	220#
	Po	−α	◆	−7900#	200#
193	Os			−33396	4
	Ir			−34536.3	2.9
	Pt			−34479.7	2.9
	Au	4n		−33411	9
	Hg	−		−31071	19
	Tl	+α		−27430#	250#
	Pb	x		−22280#	190#
	Bi	−α	◆	−15780#	350#
	Po	−α		−8290#	280#
	At	−α		180#	400#
194	Os	+		−32435	4
	Ir			−32531.9	2.9
	Pt			−34778.6	2.9
	Au	−		−32287	12
	Hg	−		−32247	23
	Tl	+α		−26960#	210#
	Pb	−α	◆	−24250#	150#
	Bi	−α	◆	−16070#	430#
	Po	−α		−10910	200
	At	IT	◆	−960#	400#

A	Elt.	Orig.	S	Mass excess (keV)	
195	Os	+		−29690	500
	Ir	−n		−31692.4	2.9
	Pt			−32812.4	2.9
	Au	−		−32586	3
	Hg	−		−31080	50
	Tl	+α		−28270#	130#
	Pb	+	◆	−23780#	410#
	Bi	−α	◆	−17930#	220#
	Po	−α		−11140#	220#
	At	−α		−3210#	400#
196	Os	+pp		−28300	40
	Ir	+		−29450	40
	Pt			−32662.9	2.9
	Au			−31157	4
	Hg			−31843	4
	Tl	+α		−27470#	140#
	Pb	x		−25420#	140#
	Bi	−α	◆	−18060#	210#
	Po	−α	◆	−13500#	180#
	At	−α		−4000#	230#
	Rn	−α	◆	2150#	200#
197	Ir	+p		−28283	20
	Pt			−30438.1	2.9
	Au			−31157.0	2.9
	Hg			−30557	4
	Tl	+α		−28380	30
	Pb	x		−24800#	100#
	Bi	+α		−19620	240
	Po	−α		−13450#	190#
	At	−α	◆	−6250#	350#
	Rn	−α		1550#	280#
198	Ir	x		−25820#	200#
	Pt	−n		−29923	4
	Au			−29598.0	2.9
	Hg			−30970.5	2.9
	Tl	−		−27510	80
	Pb	x		−26100#	90#
	Bi	+α		−19540	180
	Po	−α	◆	−15520#	150#
	At	−α	◆	−6750#	430#
	Rn	−α		−1140	200
199	Ir	p−2n		−24420	40
	Pt	−n		−27408	4
	Au			−29111.0	2.9
	Hg			−29563.3	2.9
	Tl			−28120	100
	Pb			−25230	70
	Bi	+α		−20890	120
	Po	−α	◆	−15280#	410#
	At	−α	◆	−8730#	220#
	Rn	−α		−1580#	230#
200	Pt	−nn		−26618	20
	Au	+		−27280	50
	Hg			−29520.2	2.9
	Tl	−		−27064	6
	Pb	4n		−26254	13
	Bi	+α		−20360	90
	Po	−α		−17010#	140#
	At	−α	◆	−9040#	210#
	Rn	−α	◆	−4030#	180#
	Fr	−α		6050#	240#

A	Elt.	Orig.	S	Mass excess (keV)	
201	Pt	+		−23760	50
	Au			−26416	4
	Hg			−27679.1	2.9
	Tl	+nn		−27196	15
	Pb	+α		−25290	30
	Bi	+α		−21450	30
	Po	−α		−16570#	100#
	At	+α		−10720	240
	Rn	−α		−4160#	200#
	Fr	−α	◆	3710#	350#
202	Pt	x		−22600#	300#
	Au	+		−24420	170
	Hg			−27362.1	2.9
	Tl			−25997	15
	Pb			−25948	10
	Bi	+α		−20800	50
	Po	−α		−17980#	90#
	At	+α		−10760	180
	Rn	−α	◆	−6320#	150#
	Fr	−α	◆	3060#	430#
203	Au			−23159	4
	Hg			−25283	3
	Tl			−25775.3	2.9
	Pb			−24801	7
	Bi			−21547	21
	Po			−17310	70
	At			−12250	120
	Rn	−α	◆	−6230#	410#
	Fr	−α	◆	980#	230#
	Ra	−α		8580#	230#
204	Au	+		−20770#	200#
	Hg			−24707	3
	Tl			−24359.8	2.9
	Pb			−25123.5	2.9
	Bi	+α		−20674	26
	Po	−α		−18344	13
	At	+α		−11870	90
	Rn	−α		−8040#	140#
	Fr	−α	◆	550#	210#
	Ra	−α	◆	6030#	180#
205	Au	x		−18990#	300#
	Hg			−22304	5
	Tl			−23834.8	3.0
	Pb			−23783.7	2.9
	Bi			−21075	8
	Po	+α		−17544	29
	At	+α		−13010	30
	Rn	−α		−7760#	110#
	Fr			−1240	240
	Ra	−α		5760#	210#
206	Hg	+α		−20960	21
	Tl			−22267.1	3.0
	Pb			−23800.6	2.9
	Bi	−		−20043	8
	Po			−18197	10
	At			−12480	50
	Rn	−α		−9170#	90#
	Fr	IT		−1410	180
	Ra	−α	◆	3520#	150#

A	Elt.	Orig.	S	Mass excess (keV)	
207	Hg	+		−16230	150
	Tl			−21044	6
	Pb			−22467.1	2.9
	Bi			−20069	4
	Po			−17160	7
	At			−13250	21
	Rn			−8640	70
	Fr			−2930	120
	Ra	−α	◆	3470#	420#
	Ac	−α	◆	11270#	230#
208	Hg	x		−13100#	300#
	Tl	+α		−16762.6	2.9
	Pb			−21763.6	2.9
	Bi	+n		−18884	4
	Po	−α		−17483	3
	At	+α		−12498	26
	Rn	−α		−9658	13
	Fr			−2670	80
	Ra	−α		1650#	140#
	Ac	−α	◆	10700#	210#
209	Tl	+α		−13647	10
	Pb			−17629	3
	Bi			−18272.9	3.0
	Po	−α		−16380	3
	At			−12893	8
	Rn	−		−8964	29
	Fr			−3800	30
	Ra	−α		1810#	130#
	Ac	−α		8910	240
210	Tl	+α		−9254	11
	Pb			−14743	3
	Bi			−14806.1	3.0
	Po			−15968.2	2.9
	At	−α		−11987	8
	Rn	−α		−9613	10
	Fr			−3355	22
	Ra	−α		420#	90#
	Ac	−α		8620	190
	Th	−α	◆	14000#	150#
211	Pb			−10496.6	3.0
	Bi			−11869	6
	Po	−α		−12447.7	3.0
	At	−α		−11662	4
	Rn	−α		−8770	7
	Fr			−4164	21
	Ra	−α		830	70
	Ac	−α		7120	130
	Th	−α	◆	13840#	420#
212	Pb			−7556.7	2.7
	Bi			−8130.5	2.9
	Po			−10384.5	2.9
	At	−α		−8631	4
	Rn	−α		−8673	4
	Fr			−3544	26
	Ra	−α		−202	14
	Ac	−α		7280	90
	Th	−α		12030#	140#

A	Elt.	Orig.	S	Mass excess (keV)	
213	Pb	+		−3260#	100#
	Bi			−5240	8
	Po			−6667	4
	At	$-\alpha$		−6594	6
	Rn	$-\alpha$		−5712	7
	Fr			−3563	8
	Ra	$-\alpha$		322	30
	Ac	$-\alpha$		6120	60
	Th	$-\alpha$		12070#	130#
	Pa	$-\alpha$		19730	250
214	Pb			−188.0	2.5
	Bi			−1212	11
	Po			−4484	3
	At	$-\alpha$		−3394	5
	Rn	$-\alpha$		−4335	10
	Fr	$-\alpha$		−974	9
	Ra	$-\alpha$		85	11
	Ac	$-\alpha$		6420	50
	Th	$-\alpha$		10670#	90#
	Pa	$-\alpha$		19320	190
215	Bi	$+\alpha$		1710	100
	Po			−545.3	2.9
	At	$-\alpha$		−1266	7
	Rn	$-\alpha$		−1184	8
	Fr	$-\alpha$		304	8
	Ra	$-\alpha$		2519	8
	Ac	$-\alpha$		6010	50
	Th	$-\alpha$		10920	70
	Pa	$-\alpha$		17790	140
216	Bi	+		5780#	100#
	Po			1774.7	2.7
	At			2244	4
	Rn	$-\alpha$		240	8
	Fr	$-\alpha$		2969	13
	Ra	$-\alpha$		3277	9
	Ac	$-\alpha$		8124	27
	Th	$-\alpha$		10294	16
	Pa	$-\alpha$		17800	110
217	Po	$-\alpha$		5830#	100#
	At			4387	8
	Rn	$-\alpha$		3646	5
	Fr	$-\alpha$		4300	7
	Ra	$-\alpha$		5874	10
	Ac	$-\alpha$		8693	13
	Th	$-\alpha$		12170	30
	Pa	$-\alpha$		17040	80
218	Po			8351.6	2.5
	At	$-\alpha$		8087	12
	Rn			5204	3
	Fr	$-\alpha$		7045	5
	Ra	$-\alpha$		6636	11
	Ac	$-\alpha$		10830	50
	Th	$-\alpha$		12359	14
	Pa	$-\alpha$		18640	70
	U	$-\alpha$		21880#	100#
219	At	$+\alpha$		10520	80
	Rn			8825.7	2.8
	Fr	$-\alpha$		8608	7
	Ra	$-\alpha$		9379	9
	Ac	$-\alpha$		11560	50
	Th	$-\alpha$		14460	50
	Pa	$-\alpha$		18520	70
	U	$-\alpha$		23210	80
220	At	$-\alpha$		14250#	110#
	Rn			10604.3	2.7
	Fr			11469	5
	Ra	$-\alpha$		10260	10
	Ac	$-\alpha$		13740	50
	Th	$-\alpha$		14655	22
	Pa	$-\alpha$		20380	60
	U	$-\alpha$		23020#	200#
221	At	x		16900#	300#
	Rn	$-\alpha$		14400#	100#
	Fr			13270	8
	Ra	$-\alpha$		12955	7
	Ac	$-\alpha$		14510	50
	Th	$-\alpha$		16927	10
	Pa	$-\alpha$		20370	50
	U	$-\alpha$		24550#	110#
222	At	x		20800#	300#
	Rn			16366.8	2.5
	Fr			16342	21
	Ra			14309	5
	Ac	$-\alpha$		16607	6
	Th	$-\alpha$		17190	13
	Pa	$-\alpha$		22100#	70#
	U	$-\alpha$		24280#	100#
223	At	x		23600#	400#
	Rn	x		20300#	300#
	Fr			18379.0	2.7
	Ra			17230.0	2.8
	Ac	$-\alpha$		17816	7
	Th	$-\alpha$		19371	10
	Pa	$-\alpha$		22320	70
	U	$-\alpha$		25820	70
224	Rn	x		22440#	300#
	Fr			21640	50
	Ra			18818.0	2.7
	Ac	$-\alpha$		20221	5
	Th	$-\alpha$		19989	12
	Pa	$-\alpha$		23860	50
	U	$-\alpha$		25700	25
225	Rn	x		26490#	300#
	Fr			23853	10
	Ra			21987	3
	Ac			21630	8
	Th	$-\alpha$		22301	7
	Pa	$-\alpha$		24330	70
	U	$-\alpha$		27370	50
	Np	$-\alpha$		31580	70
226	Rn	x		28770#	400#
	Fr			27330	90
	Ra			23662.3	2.5
	Ac			24303	4
	Th			23186	5
	Pa	$-\alpha$		26019	12
	U	$-\alpha$		27330	19
	Np	$-\alpha$		32720#	90#
227	Rn	$+\alpha$		32980#	420#
	Fr			29650	100
	Ra			27172.3	2.5
	Ac			25846.1	2.7
	Th			25801.3	2.8
	Pa	$-\alpha$		26821	8
	U	$-\alpha$		29007	17
	Np	$-\alpha$		32560	70
228	Rn	$+\alpha$		35480#	470#
	Fr	+	◆	33280#	200#
	Ra	$+\alpha$		28936.0	2.5
	Ac	−		28890.1	2.6
	Th			26763.1	2.7
	Pa	$-\alpha$		28911	5
	U	$-\alpha$		29218	16
	Np	x		33700#	200#
	Pu	$-\alpha$		36070	30
229	Fr	$+\alpha$		35790#	360#
	Ra	+		32430	60
	Ac	+		30670	50
	Th			29579.9	2.9
	Pa	$-\alpha$		29890	9
	U	$-\alpha$		31201	8
	Np	$-\alpha$		33760	90
	Pu	$-\alpha$		37390	70
230	Fr	$+\alpha$		39600#	450#
	Ra	−4n		34540	30
	Ac	+		33560	100
	Th			30857.2	2.0
	Pa			32167	3
	U	$-\alpha$		31603	5
	Np	$-\alpha$		35220	50
	Pu	$-\alpha$		36930	24
231	Fr	$+\alpha$		42300#	520#
	Ra	x		38400#	300#
	Ac	+		35910	100
	Th			33810.5	2.0
	Pa			33421.0	2.6
	U	$-\alpha$		33803	4
	Np	$-\alpha$		35610	50
	Pu	$-\alpha$		38430#	100#
	Am	x		42440#	300#
232	Fr	$+\alpha$		46250#	640#
	Ra	$+\alpha$		40700#	360#
	Ac	+		39140	100
	Th			35443.7	2.0
	Pa	+		35939	8
	U	$-\alpha$		34601.5	2.7
	Np	−		37350#	100#
	Pu	$-\alpha$		38358	19
	Am	x		43400#	300#
233	Ra	$+\alpha$		44710#	470#
	Ac	x		41500#	300#
	Th			38728.6	2.0
	Pa			37483.5	2.3
	U			36913.4	2.8
	Np	$-\alpha$		37940	50
	Pu	$-\alpha$		40040	50
	Am	$-\alpha$		43290#	220#
	Cm	x		47320#	400#

A	Elt.	Orig.	S	Mass excess (keV)	
234	Ra	$+\alpha$		47090#	540#
	Ac	x		45100#	400#
	Th	$+\alpha$		40609	4
	Pa	IT		40336	5
	U			38140.6	2.0
	Np	$-$		39950	9
	Pu	$-\alpha$		40338	7
	Am	$-\alpha$		44520#	210#
	Cm	x		46800#	300#
235	Ac	$+\alpha$		47600#	420#
	Th	+n2p		44250	50
	Pa	+		42320	50
	U			40914.1	2.0
	Np			41037.8	2.1
	Pu	$-\alpha$		42179	21
	Am	$-\alpha$		44740#	210#
	Cm	$-\alpha$		48060#	220#
	Bk	x		52700#	400#
236	Ac	$+\alpha$		51400#	500#
	Th	x		46310#	300#
	Pa	+		45340	200
	U			42440.6	1.9
	Np	IT		43370	50
	Pu	$-\alpha$		42893.5	2.7
	Am	$-$		46170#	100#
	Cm	$-\alpha$		47880#	200#
	Bk	x		53400#	400#
237	Th	$+\alpha$		50200#	360#
	Pa	+		47640	100
	U			45386.1	2.0
	Np			44867.5	2.0
	Pu			45087.8	2.3
	Am	$-\alpha$		46550	50
	Cm	$-\alpha$		49270#	210#
	Bk	$-\alpha$		53210#	300#
	Cf	x		57820#	500#
238	Th	$+\alpha$		52390#	360#
	Pa	+		50760	60
	U			47303.7	2.0
	Np			47450.7	2.0
	Pu			46158.7	2.0
	Am	$-\alpha$		48420	50
	Cm	$-\alpha$		49380	40
	Bk	$-\alpha$		54270#	290#
	Cf	x		57200#	400#
239	Pa	x		53220#	300#
	U	$-$n		50568.7	2.0
	Np			49305.3	2.1
	Pu			48583.5	2.0
	Am	$-\alpha$		49386.4	2.8
	Cm	$-$		51190#	100#
	Bk	$-\alpha$		54360#	290#
	Cf	$-\alpha$		58290#	230#
240	Pa	x		56800#	300#
	U	$+\alpha$		52709	5
	Np	+		52321	15
	Pu			50121.3	1.9
	Am	+n		51500	14
	Cm	$-\alpha$		51715.7	2.7
	Bk	$-$		55660#	150#
	Cf	$-\alpha$		58030#	200#
	Es	x		64200#	400#

A	Elt.	Orig.	S	Mass excess (keV)	
241	U	x		56200#	300#
	Np	+		54260	70
	Pu			52951.0	1.9
	Am			52930.2	2.0
	Cm			53697.6	2.3
	Bk	$-$		56100#	200#
	Cf	$-\alpha$		59350#	260#
	Es	$-\alpha$		63960#	300#
242	U	$+\alpha$		58610#	200#
	Np	IT		57410#	210#
	Pu			54713.0	2.0
	Am			55464.0	2.0
	Cm	$-\alpha$		54799.2	2.0
	Bk	$-$		57800#	200#
	Cf	$-\alpha$		59330	40
	Es	$-\alpha$		64920#	330#
	Fm	x		68400#	400#
243	Np	IT		59870*	30*
	Pu			57750	3
	Am			57168.3	2.2
	Cm	$-\alpha$		57177.2	2.2
	Bk	$-\alpha$		58686	5
	Cf	$-\alpha$		60940#	140#
	Es	$-\alpha$		64860#	290#
	Fm	$-\alpha$		69410#	240#
244	Np	x		63200#	300#
	Pu			59800	5
	Am			59875.9	2.1
	Cm			58447.8	1.9
	Bk	$-\alpha$		60703	14
	Cf	$-\alpha$		61470	3
	Es	$-\alpha$		66110#	180#
	Fm	$-\alpha$		69000#	280#
245	Pu	$-$n		63098	14
	Am	$+\alpha$		61893	4
	Cm			60999.4	2.7
	Bk	$-\alpha$		61809.6	2.5
	Cf	$-\alpha$		63380#	100#
	Es	$-\alpha$		66430#	200#
	Fm	$-\alpha$		70210#	280#
	Md	IT		75470#	380#
246	Pu			65389	15
	Am	IT		64989	18
	Cm			62612.7	2.2
	Bk	$-$		63960	60
	Cf	$-\alpha$		64085.7	2.2
	Es	$-\alpha$		67970#	220#
	Fm	$-\alpha$		70120	40
	Md	$-\alpha$		76320#	390#
247	Pu	x		69000#	300#
	Am	+		67150#	100#
	Cm			65528	4
	Bk	$-\alpha$		65483	6
	Cf	$-$		66129	8
	Es	$-\alpha$		68600*	30*
	Fm	$-\alpha$		71560#	150#
	Md	IT		76200#	370#

A	Elt.	Orig.	S	Mass excess (keV)	
248	Am	+		70560#	200#
	Cm			67386	5
	Bk	IT		68070#	70#
	Cf	$-\alpha$		67233	5
	Es	$-\alpha$		70290#	50#
	Fm	$-\alpha$		71897	12
	Md	$-\alpha$		77230#	240#
249	Am	x		73100#	300#
	Cm	$-$n		70744	5
	Bk	+		69843	3
	Cf	$-\alpha$		69719.4	2.8
	Es	$-\alpha$		71170*	30*
	Fm	$-\alpha$		73610#	140#
	Md	$-\alpha$		77320#	220#
	No	$-\alpha$		81810#	340#
250	Cm	$-$nn		72983	11
	Bk	$+\alpha$		72946	4
	Cf	$-\alpha$		71166.1	2.2
	Es	$-$		73270#	100#
	Fm	$-\alpha$		74068	12
	Md	$-\alpha$		78700#	300#
	No	$-\alpha$		81500#	200#
251	Cm	+		76641	23
	Bk	+		75221	11
	Cf	$-\alpha$		74128	5
	Es	$-\alpha$		74504	6
	Fm	$-\alpha$		75979	8
	Md	$-\alpha$		79100*	200*
	No	$-\alpha$		82870#	180#
	Lr	x		87900#	300#
252	Cm	x		79060#	300#
	Bk	+		78530#	200#
	Cf	$-\alpha$		76028	5
	Es	$-$		77290	50
	Fm	$-\alpha$		76811	6
	Md	x		80700#	200#
	No	$-\alpha$		82871	13
	Lr	x		88800#	300#
253	Bk	$-\alpha$		80930#	360#
	Cf	$-\alpha$		79295	6
	Es	$-\alpha$		79007	3
	Fm	$-\alpha$		79341	5
	Md	x		81300#	210#
	No	$-\alpha$		84440#	250#
	Lr	$-\alpha$		88730#	230#
	Db	$-\alpha$		93780#	450#
254	Bk	x		84390#	300#
	Cf	$-\alpha$		81335	12
	Es	$-\alpha$		81986	4
	Fm	$-\alpha$		80898	3
	Md	$-$		83580#	100#
	No	$-\alpha$		84718	18
	Lr	$-\alpha$		89970#	340#
	Db	$-\alpha$		93300#	290#
255	Cf	+		84800#	200#
	Es	$-\alpha$		84083	11
	Fm	$-\alpha$		83793	5
	Md	$-\alpha$		84836	7
	No	$-\alpha$		86845	12
	Lr	$-\alpha$		90140*	210*
	Db	$-\alpha$		94540#	210#
	Jl	$-\alpha$		100040#	420#

A	Elt.	Orig.	S	Mass excess (keV)	
256	Cf	x		87040#	300#
	Es	+		87180#	100#
	Fm	−α		85480	7
	Md	−α		87610	50
	No	−α		87817	8
	Lr	−α		92000#	220#
	Db	−α		94248	27
	Jl	−α		100700#	360#
257	Es	−α		89400#	410#
	Fm	−α		88584	6
	Md	−α		88990	3
	No	−α		90220	30
	Lr	−α		92780#	210#
	Db	−α		96010#	270#
	Jl	−α		100470#	230#
258	Fm	−α		90420#	200#
	Md	−α		91683	5
	No	−α		91470#	200#
	Lr	−α		94900#	100#
	Db	−α		96470#	200#
	Jl	−α		101940#	340#
	Rf	−α		105400#	410#
259	Fm	−α		93700#	280#
	Md	−α		93620#	200#
	No	−α		94100*	100*
	Lr	−α		95940*	70*
	Db	−α		98390*	70*
	Jl	−α		102210#	290#
	Rf	−α		106800#	210#
260	Md	−α		96550#	320#
	No	−α		95610#	200#
	Lr	−α		98340#	120#
	Db	−α		99140#	200#
	Jl	−α		103790#	230#
	Rf	−α		106600	40
	Bh	−α		113460#	620#
261	No	−α		98500#	300#
	Lr	−α		99620#	200#
	Db	−α		101300*	110*
	Jl	−α		104430#	230#
	Rf	−α		108240#	280#
	Bh	−α		113460#	240#
262	No	−α		100150#	540#
	Lr	−α		102180#	300#
	Db	−α		102390#	280#
	Jl	−α		106330#	180#
	Rf	−α		108500#	280#
	Bh	−α		114580#	380#
263	Lr	−α		103760#	360#
	Db	−α		104830#	190#
	Jl	−α		107190*	170*
	Rf	IT		110210*	120*
	Bh	−α		114710#	420#
	Hn	−α		119890#	370#
264	Db	−α		106170#	450#
	Jl	−α		109430#	230#
	Rf	−α		110780#	280#
	Bh	−α		116190#	280#
	Hn	−α		119610	50
265	Jl	−α		110530#	280#
	Rf	−α		112770*	140*
	Bh	−α		116620#	380#
	Hn	IT		121100#	300#
	Mt	−α		127210#	470#
266	Rf	−α		113580#	290#
	Bh	−α		118310#	350#
	Hn	−α		121130#	410#
	Mt	−α		128490#	350#
267	Bh	−α		118990#	340#
	Hn	−α		122750*	100*
	Mt	−α		128110#	580#
	Xa	−α		134090#	380#
268	Hn	−α		123100#	410#
	Mt	−α		129310#	320#
	Xa	−α		133700#	500#
269	Hn	−α		124930#	420#
	Mt	−α		129580#	550#
	Xa	−α		135200#	290#
270	Mt	−α		131080#	610#
	Xa	−α		134720#	650#
271	Mt	−α		131550#	610#
	Xa	−α		136070#	180#
272	Xa	−α		136290#	650#
	Xb	−α		142960#	330#
273	Xa	−α		139020#	440#

Table II. Table of isomers

EXPLANATION OF TABLE

This table gives information on cases where more than one nuclear state occur in the data entering our evaluation. Element indications with suffix "m" or "n" indicate assignments to isomeric states (defined, see text, as upper states with half-lives larger than 1 ms, see also Ref. [15]. For clear identification, half-lives, spins and parities, where known from NUBASE [15], have been added. Suffixes "p" and "q" indicate shorter-lived isomers and non-isomeric levels, e.g. those ones for which the energy was derived from Nilsson model extrapolations. Suffix "r" indicates a state from a proton resonance occurring in (p,γ) reactions. Suffixes "x" or "y" apply to mixtures of levels, e.g. occurring in spallation reactions (indicated spmix in last column) or fission (fsmix).

A	Mass number $A = N + Z$.
Elt.	Element symbol (for $Z > 103$ see Section 2).
Orig.	Origin of values for secondary nuclides. zp nn : mass of ^{A}Z derived from mass of $^{A+z+n}(Z+z)$. Special notations: IT when $z = 0, n = 0$; $+$ when $z = +1, n = -1$; $-$ when $z = -1, n = +1$; ϵp when $z = -2, n = +1$; $+\alpha$ when $z = +2, n = +2$; x for distant connection.
Excitation energy	Energy difference between levels adopted as higher level and ground state, and its error. In cases where the furthest-left significant digit in the error was larger than 3, values and errors were rounded off, but not to more than tens of keV. # in place of decimal point: value and error estimated from systematic trends. $*$ in place of decimal point: value and error, for nuclei beyond $A = 225$ derived from application of the Nilsson model (see Section 6.4).

T	Half-life: s = seconds; m= minutes;
	h = hours; d = days; y = years;
	ms, μs, ns, zs = $10^{-3,-6,-9,-21}$ seconds;
	ky = 10^3 years.
	For isomeric mixtures:
	R = abundance ratio upper/lower levels;
	contamination = non-isomeric mixture.

J^π	Reported or adopted values for spin and parity:
	( ) : uncertain spin and/or parity.
	# : indicates values estimated from systematic trends in neighboring nuclides.
	high, low = high, low spin;
	am = same J^π as α-decay parent;

For isomeric mixtures: mix (spmix and fsmix if coming from spallation and fission respectively).

A	Elt.	Orig.	Excitation energy (keV)		*T*		J^π
10	Li	−n	0		2.0	zs	$(1^-,2^-)$
	Li^p	−n	220	60	1.27	zs	1^+
	Li^q		480	40			2^+
13	Be	IT	0		<10	ns	$(1/2^-)$
	Be^p	++	1500	500	n-unstable		$(5/2^+)$
14	Be	x	0		4.35	ms	0^+
	Be^p	++	1590	120			(2^+)
22	Na		0		2.6019	y	3^+
	Na^r		7408.8	0.6			1^+
28	Si		0		stable		0^+
	Si^r	−p	12541.00	0.14			3^+
41	Sc		0		596.3	ms	$7/2^-$
	Sc^r		2882.30	0.05			$7/2^-$
42	Sc		0		681.3	ms	0^+
	Sc^r		6076.31	0.08			
53	Co	p4n	0		240	ms	$(7/2^-)$
	Co^m	−p	3194	30	247	ms	$(19/2^-)$
60	Mn	IT	0		51	s	0^+
	Mn^x	x	140	80	$R = ?$		mix
70	Cu	+	0		4.5	s	1^+
	Cu^m	IT	140	80	47	s	$3^-,4^-,5^-$
78	Rb		0		17.66	m	$0(^+)$
	Rb^x		76	12	$R = 2(.5)$		spmix
81	Rb		0		4.576	h	$3/2^-$
	Rb^x		30	22	$R = ?$		spmix
	Rb^y		38	24	$R = ?$		fsmix
82	As	+	0		19.1	s	(1^+)
	As^m	+	250	200	13.6	s	(5^-)
	Rb		0		1.273	m	1^+
	Rb^x		35	19	$R = ?$		spmix
	Rb^y		37	19	$R = ?$		fsmix
84	Br		0		31.80	m	2^-
	Br^m	+	320	100	6.0	m	$(5^-,6^-)$
	Rb		0		32.77	d	2^-
	Rb^x		280	50	$R = ?$		fsmix
	Y	−	0		4.6	s	1^+
	Y^m	−	−80	190	40	m	(5^-)
88	Nb	−	0		14.5	m	(8^+)
	Nb^m	−	390#	220#	7.8	m	(4^-)
90	Rb		0		158	s	0^-
	Rb^x		81	11	$R = 2(1)$		fsmix
	Tc	−	0		8.7	s	1^+
	Tc^m	−	310	390	49.2	s	$4,5,6(^+\#)$
91	Sr		0		9.63	h	$5/2^+$
	Sr^x		39	11	$R = 6$		mix
94	Rb		0		2.702	s	$3(^-)$
	Rb^x		−110	40	contamination		
	Rb^y		90	40	contamination		
	Rh	IT	0		70.6	s	(3^+)
	Rh^m	−	300#	200#	25.8	s	(8^+)
96	Y		0		5.34	s	0^-
	Y^m	+	1140	30	9.6	s	$(8)^+$
98	Rb		0		114	ms	(1,0)
	Rb^m	+	380	120	96	ms	(4,5)
	Y		0		548	ms	$(0)^-$
	Y^m	+	410	30	2.0	s	(5^+)
100	Nb	+	0		1.5	s	1^+
	Nb^m	+	470	40	2.99	s	$(4^+,5^+)$
102	Nb	+	0		1.3	s	1^+
	Nb^m	+	120	50	4.3	s	high
104	Nb	+	0		4.8	s	(1^+)
	Nb^m	+	220	120	920	ms	high
106	Rh	+	0		29.80	s	1^+
	Rh^m	+	136	12	131	m	$(6)^+$
108	Rh	+	0		16.8	s	1^+
	Rh^m	+	−60	110	6.0	m	(5^+)
110	Rh	IT	0		3.2	s	1^+
	Rh^m	+	0	200	28.5	s	(>3)
115	Sb	−	0		32.1	m	$5/2^+$
	Sb^x	IT	860	100			
	Te	IT	0		5.8	m	$7/2^+$
	Te^m	−	10	7	6.7	m	$(1/2)^+$
116	Sb		0		15.8	m	3^+
	Sb^m	−	380	40	60.3	m	8^-
	Cs		0		700	ms	(1^+)
	Cs^m	IT	100#	60#	3.84	s	$> 4^+$
	Cs^x		5	4	$R = ?$		spmix
117	Cs	IT	0		8.4	s	$9/2^+\#$
	Cs^m	IT	150#	100#	6.5	s	$3/2^+\#$
	Cs^x	x	50	50	$R = ?$		spmix
118	In		0		5.0	s	1^+
	In^m	IT	100#	50#	4.45	m	5^+
	Sb	−	0		3.6	m	1^+
	Sb^m	−	250	6	5.00	h	8^-
	Cs	IT	0		14	s	2
	Cs^m	IT	100#	60#	17	s	(7^-)
	Cs^x		5	4	$R < .1$		spmix
119	Cs		0		43.0	s	$9/2^+$
	Cs^m	IT	50#	30#	30.4	s	$3/2(^+)$
	Cs^x		16	11	$R = .5(.25)$		spmix
120	In	+	0		3.08	s	1^+
	In^m	IT	70	60	46.2	s	5^+
	I	−	0		81.0	m	2^-
	I^m	−	320	150	53	m	4,5,6,7,8
	Cs		0		64	s	2
	Cs^m	IT	100#	60#	57	s	(7)
	Cs^x		5	4	$R < .1$		spmix
121	Cs	IT	0		155	s	$3/2(^+)$
	Cs^x		46	8	$R = 2(1)$		spmix
122	In	+	0		1.5	s	1^+
	In^n	+	290	140	10.8	s	8^-
	Cs		0		21.0	s	1^+
	Cs^m	x	123	19	4.5	m	8^-
	Cs^x		12	6	$R = .1(.05)$		spmix
123	Cs		0		5.94	m	$1/2^+$
	Cs^x		7	4	$R < .1$		spmix
124	In	+	0		3.17	s	3^+
	In^m	+	−20	70	2.4	s	$8(^-\#)$
	Cs		0		30.8	s	1^+
	Cs^x		28	17	$R = ?$		spmix

A	Elt.	Orig.	Excitation energy (keV)		*T*		J^π
125	Cd	+	0		650	ms	$(3/2)^+$
	Cd^m	+	50	70	570	ms	$(11/2^-)$
126	In	+	0		1.60	s	$3(^+)$
	In^m	+	100	60	1.64	s	$8(^-\#)$
127	In	+	0		1.083	s	$9/2(^+)$
	In^m	+	460	70	3.76	s	$(1/2^-)$
128	In	+	0		776	ms	$(2,3)^+$
	In^m	+	320	60	776	ms	$(7,8)^-$
	Sb	IT	0		9.01	h	8^-
	Sb^m	+	10	7	10.4	m	5^+
129	In	+	0		611	ms	$(9/2^+)$
	In^m	+	380	70	1.26	s	$(1/2^-)$
130	In	+	0		278	ms	1^-
	In^m	+	50	50	550	ms	(10^-)
	In^n	+	400	60	550	ms	(5^+)
	Sb	+	0		39.5	m	(8^-)
	Sb^m	IT	5.10	0.20	6.3	m	$(5)^+$
	Cs		0		29.21	m	1^+
	Cs^x	IT	27	15	$R = .2(.1)$		fsmix
131	In	+	0		280	ms	$(9/2^+)$
	In^m	+	350	40	350	ms	$1/2^-$
	In^n	+	4100	80	320	ms	$(19/2^+..23/2^+)$
132	I	+	0		2.295	h	4^+
	I^m	+	108	15	1.387	h	(8^-)
134	Sb	+	0		780	ms	(0^-)
	Sb^m	+	80	110	10.22	s	(7^-)
	Pr	IT	0		17	m	2^-
	Pr^m	$-$	0#	200#	$\sim$11	m	(5^-)
135	Pm	IT	0		49	s	$5/2^+$
	Pm^m	$-$	100#	200#	40	s	$(11/2^-)$
136	I		0		83.4	s	(1^-)
	I^m	+	650	120	46.9	s	(6^-)
137	Pm	IT	0				$(5/2^+)$#
	Pm^m	$-$	0#	100#	2.4	m	$11/2^-$
138	Cs		0		33.41	m	3^-
	Cs^x		37	22	$R = ?$		fsmix
	Pr	$-$	0		1.45	m	1^+
	Pr^m	$-$	364	22	2.12	h	7^-
	Pm	$-$	0		3.24	m	(3^+)
	Pm^m	$-$	80	260	10	s	1^+
140	Pm	$-$	0		9.2	s	1^+
	Pm^m	$-$	440	70	5.95	m	8^-
142	Eu	$-$	0		2.4	s	1^+
	Eu^m	$-$	520	50	1.22	m	8^-
145	Tb	IT	0				$(1/2^+)$
	Tb^m	$-$	0#	100#	29.5	s	$(11/2^-)$
146	Tb	$-$	0		8	s	1^+
	Tb^m	IT	150#	100#	23	s	5^-
	Tm	$-$p	0		235	ms	(6^-)
	Tm^m	$-$p	71	7	72	ms	(10^+)
148	Ho	IT	0		2.2	s	1^+
	Ho^m	$-$	0#	100#	9.59	s	6^-
149	Ho	$-$	0		21.1	s	$(11/2^-)$
	Ho^m	IT	48.80	0.20	56	s	$(1/2^+)$
150	Tb		0		3.48	h	(2^-)
	Tb^m	$-$	470	50	5.8	m	$(8^+,9^+)$
	Ho	$-$	0		72	s	$2,3(^-\#)$
	Ho^m	$-$	120#	110#	26	s	(9^+)
151	Tm	IT	0		4.13	s	$(11/2^-)$
	Tm^m	$+\alpha$	45#	15#	5.2	s	$(1/2^+)$
	Lu	IT	0				$(3/2^+)$#
	Lu^m	$-$p	0#	100#	85	ms	$11/2^-$
152	Pm	+	0		4.1	m	1^+
	Pm^m	+	140	110	7.52	m	4^-
	Tm	x	0		8.0	s	(2^-)
	Tm^m	IT	200#	150#	5.2	s	(9^+)
154	Pm	+	0		1.73	m	$(0,1)$
	Pm^m	+	50	130	2.68	m	$(3,4)$
	Ho	$-\alpha$	0		11.76	m	2^-
	Ho^m	$-\alpha$	260	50	3.10	m	8^+
	Tm	$-\alpha$	0		8.1	s	(2^-)
	Tm^m	$-\alpha$	200#	120#	3.30	s	(9^+)
155	Lu	$+\alpha$	0		140	ms	$(1/2^+,3/2^+)$
	Lu^m	$-\alpha$	26#	16#	68	ms	$(11/2^-)$
	Lu^n	$-\alpha$	1800#	50#	2.60	ms	$(25/2^-)$
156	Lu	$-\alpha$	0		730	ms	(2^-)
	Lu^m	$-\alpha$	320#	170#	179	ms	(9^+)
	Hf	$-\alpha$	0		25	ms	0^+
	Hf^p	$-\alpha$	1980	50	444	μs	high
	Ta	$-$p	0		220	ms	(2^-)
	Ta^m	$-$p	82	18	320	ms	(9^+)
157	Lu	IT	0		4.7	s	$3/2^+$
	Lu^m	$-\alpha$	32.0	2.0	4.74	s	$11/2^-$
158	W	$-\alpha$	0		900	μs	0^+
	W^p	$-\alpha$	1900	40	500	μs	8^+
159	Ta	$+\alpha$	0				$(1/2^+,3/2^+)$
	Ta^m	$-\alpha$	110#	50#	570	ms	$(11/2^-)$
160	Ta	$-\alpha$	0				low
	Ta^m	$-\alpha$	420#	180#	1.5	s	high
163	Re	$+\alpha$	0				$(1/2^+,3/2^+)$
	Re^m	$-\alpha$	170#	70#	260	ms	$(11/2^-)$
164	Re	$-\alpha$	0		880	ms	
	Re^p	IT	150#	100#			high
167	Re	IT	0		3.4	s	$(9/2^-)$
	Re^m	$-\alpha$	150#	100#	6.1	s	$(1/2)$
	Ir	$-$p	0		33.5	ms	$1/2^+$
	Ir^m	$-\alpha$	220#	90#	29.5	ms	$11/2^-$
168	Lu	$-$	0		5.5	m	$6(^-)$
	Lu^m	$-$	220	130	6.7	m	3^+
169	Re	x	0		8.1	s	$(9/2^-)$ #
	Re^m	IT	150#	70#	16.3	s	$(1/2^-)$#
	Re^p	IT	300#	100#			$(5/2^+)$
170	Ho	+	0		2.76	m	(6^+)
	Ho^m	+	100	80	43	s	$1(^+)$
171	Au	IT	0				$1/2^+$#
	Au^m	$-\alpha$	300#	200#	$\sim$2	ms	$(11/2^-)$
172	Ir	$-\alpha$	0		4.4	s	(3^+)
	Ir^m	$-\alpha$	139	10	2.1	s	(7^+)

A	Elt.	Orig.	Excitation energy (keV)		T		J^π
173	Ir	$-\alpha$	0		9.8	s	(5/2$^+$,3/2$^+$)
	Ir^m	$-\alpha$	100#	100#	2.20	s	(11/2$^-$)
174	Ir	$+\alpha$	0		9	s	(3$^+$)
	Ir^m	$-\alpha$	193	11	4.9	s	(7$^+$)
175	Ir	$-\alpha$	0		9	s	(5/2$^-$)
	Ir^p	IT	100	20			am
	Au	IT	0				11/2$^-$#
	Au^m	$-\alpha$	100#	200#	200	ms	5/2$^+$#
177	Au	$-\alpha$	0		1.18	s	
	Au^p	$+\alpha$	490#	360#			
	Hg	$-\alpha$	0		130	ms	
	Hg^p	IT	120#	100#			13/2$^+$
178	Lu		0		28.4	m	1($^+$)
	Lu^m		123.7	2.6	23.1	m	9($^-$)
	Ta	IT	0		9.31	m	1$^+$
	Ta^m	–	0	100	2.36	h	(7)$^-$
179	Au	$-\alpha$	0		7.1	s	(5/2$^+$)
	Au^p	IT	200#	150#			(11/2$^-$)
	Hg	$+\alpha$	0		1.09	s	
	Hg^p	$+\alpha$	160#	80#			(13/2$^+$)
	Tl	$-\alpha$	0		190	ms	1/2$^+$
	Tl^m	$-\alpha$	560#	210#	1.4	ms	(9/2$^-$)
180	Ta		0		8.152	h	1$^+$
	Ta^m	+n	75.2	1.3	stable		9$^-$
181	Pt	$+\alpha$	0		51	s	1/2$^-$
	Pt^p	$+\alpha$	396	14			(13/2$^+$)
	Au	$+\alpha$	0		11.4	s	5/2$^-$
	Au^p	$+\alpha$	440#	200#			(11/2$^-$)
	Hg	$+\alpha$	0		3.6	s	1/2($^-$)
	Hg^p	$+\alpha$	110#	80#			13/2$^+$
	Tl	$-\alpha$	0		3.4	s	(1/2$^+$)
	Tl^m	IT	600#	200#	2.7	ms	(9/2$^-$)
	Pb	IT	0				(1/2$^-$#)
	Pb^m	$-\alpha$	90#	60#	60	ms	(13/2$^+$)
182	Re	IT	0		64.0	h	7$^+$
	Re^m		60	100	12.7	h	2$^+$
	Tl	x	0		2.0	s	
	Tl^m	IT	100#	100#	2.9	s	7$^+$
	Tl^p	IT	600#	140#			11$^-$
183	Au	IT	0		42.0	s	5/2$^-$
	Au^q	$+\alpha$	230.6	0.6			11/2$^-$
	Hg	$+\alpha$	0		8.8	s	1/2$^-$
	Hg^m	$+\alpha$	240#	40#	1	s	13/2$^+$
	Tl	$+\alpha$	0		6.9	s	(1/2$^+$)
	Tl^m	$-\alpha$	460#	100#	60	ms	(9/2$^-$)
	Pb	x	0		300	ms	(1/2$^-$)
	Pb^m	IT	70#	40#	6	s	13/2$^+$
184	Tl	x	0				(2$^+$)#
	Tl^m	IT	100#	100#	11	s	7$^+$
	Tl^p	IT	500#	140#			11$^-$
185	Tl	x	0		19.5	s	(1/2$^+$)
	Tl^m	IT	452.8	2.0	1.83	s	(9/2$^-$)
	Pb	x	0		4.1	s	1/2$^-$#
	Pb^m	IT	60#	40#	6.1	s	13/2$^+$#
	Bi	IT	0				(9/2$^-$)
	Bi^p	$-$p	100#	100#	45	μs	(1/2$^+$)
186	Tl	$-\alpha$	0		27.5	s	2$^+$
	Tl^m	IT	100#	50#	4.5	s	7$^+$
	Tl^n	IT	470#	50#	2.9	s	10$^-$
	Bi	$-\alpha$	0				
	Bi^m	$-\alpha$	250#	250#	10	ms	10$^-$
187	Hg	IT	0		1.9	m	3/2$^-$
	Hg^m	$+\alpha$	100#	70#	2.4	m	13/2$^+$
	Tl	x	0		~51	s	(1/2$^+$)
	Tl^m	IT	332	4	15.60	s	(9/2$^-$)
	Pb	x	0		15.2	s	(3/2$^-$)
	Pb^m	IT	60#	40#	18.3	s	(13/2$^+$)
	Bi	$-\alpha$	0		35	ms	(9/2$^-$)
	Bi^m	IT	150#	100#	0.8	ms	(1/2$^+$)
188	Tl	x	0		71	s	(2$^-$)
	Tl^m	IT	100#	50#	71	s	(7$^+$)
	Tl^n	IT	370#	50#	41	ms	(9$^-$)
	Bi	$-\alpha$	0		44	ms	
	Bi^m	$-\alpha$	190#	150#	210	ms	(10$^-$)
189	Tl	$+\alpha$	0		2.3	m	(1/2$^+$)
	Tl^m	–	283	6	1.4	m	9/2($^-$)
	Pb	x	0				(1/2$^-$#)
	Pb^m	IT	90#	60#	51	s	13/2$^+$
	Bi	$-\alpha$	0		680	ms	(9/2$^-$)
	Bi^m	$-\alpha$	217	25	7.0	ms	(1/2$^+$)
190	Re	+	0		3.1	m	(2)$^-$
	Re^m	IT	210	50	3.2	h	(6$^-$)
	Tl	–	0		2.6	m	(2)$^-$
	Tl^m	–	170	500	3.7	m	(7$^+$)
	Bi	$-\alpha$	0		6.3	s	3$^+$
	Bi^m	$-\alpha$	210#	50#	6.2	s	10$^-$
191	Tl	$+\alpha$	0				(1/2$^+$)
	Tl^m	–	297	7	5.22	m	9/2($^-$)
	Pb	x	0		1.33	m	(low#)
	Pb^m	IT	90#	60#	2.18	m	13/2($^+$)
	Bi	$-\alpha$	0		12	s	(9/2$^-$)
	Bi^m	$-\alpha$	242	7	150	ms	(1/2$^+$)
192	Tl	– –	0		9.6	m	(2$^-$)
	Tl^p	IT	200	50			(3$^+$)
	Bi	$-\alpha$	0		37	s	(2$^+$,3$^+$)
	Bi^m	$-\alpha$	210#	50#	39.6	s	(10$^-$)
193	Pb	x	0				(3/2$^-$)
	Pb^m	IT	130#	80#	5.8	m	13/2($^+$)
	Bi	$-\alpha$	0		67	s	(9/2$^-$)
	Bi^m	$-\alpha$	308	7	3.2	s	(1/2$^+$)
	Po	$-\alpha$	0		360	ms	(3/2$^-$#)
	Po^m	$-\alpha$	140#	80#	260	ms	13/2$^+$
194	Ir		0		19.15	h	1$^-$
	Ir^n	+	350	70	171	d	10,11
	Bi	$-\alpha$	0		106	s	(2$^+$,3$^+$)
	Bi^n	$-\alpha$	270	500	125	s	(10$^-$)
	At	IT	0				3$^+$#
	At^m	$-\alpha$	250#	150#	180	ms	10$^-$#
195	Ir	$-$n	0		2.5	h	3/2$^+$
	Ir^m	+	110	20	3.8	h	11/2$^-$
	Pb	+	0		~15	m	3/2$^-$
	Pb^m	IT	202.9	0.7	15.0	m	13/2$^+$
	Bi	$-\alpha$	0		183	s	(9/2$^-$)
	Bi^m	$-\alpha$	399	6	87	s	(1/2$^+$)
	Po	$-\alpha$	0		4.64	s	(3/2$^-$)
	Po^m	$-\alpha$	190#	80#	1.92	s	(13/2$^+$)
	At	$-\alpha$	0		140	ms	9/2$^-$#
	At^m	$-\alpha$	$-$20	60	710	ms	1/2$^+$#
196	Ir	+	0		52	s	(0$^-$)
	Ir^m	+	420	110	1.40	h	(10,11$^-$)
	Bi	$-\alpha$	0		5.1	m	(3$^+$)
	Bi^m	$+\alpha$	167	3	.6	s	(7$^+$)
	Bi^n	$+\alpha$	270	4	4.00	m	(10$^-$)

A	Elt.	Orig.	Excitation energy (keV)		*T*		J^π
197	Pb	x	0		8	m	$3/2^-$
	Pb^m	IT	319.3	0.7	43	m	$13/2^+$
	Bi	$+\alpha$	0		9.3	m	$(9/2^-)$
	Bi^m	IT	510#	50#	5.2	m	$(1/2^+)$
	Po	$-\alpha$	0		56	s	$(3/2^-)$
	Po^m	$-\alpha$	230#	90#	25.8	s	$(13/2^+)$
	At	$-\alpha$	0		350	ms	$(9/2^-)$
	At^m	$-\alpha$	50	70	3.7	s	$(1/2^+)$
	Rn	$-\alpha$	0		66	ms	$(3/2^-$#)
	Rn^m	$-\alpha$	240#	90#	21	ms	$(13/2^+$#)
198	Bi	$+\alpha$	0		10.3	m	$(2^+,3^+)$
	Bi^m	$+\alpha$	150#	50#	11.6	m	(7^+)
	Bi^n	IT	390#	50#	7.7	s	(10^-)
	At	$-\alpha$	0		4.2	s	(3^+)
	At^m	$-\alpha$	370	500	1.0	s	(10^-)
199	Bi	$+\alpha$	0		27	m	$9/2^-$
	Bi^m	IT	640#	50#	24.70	m	$(1/2^+)$
	Po	$-\alpha$	0		5.48	m	$(3/2^-)$
	Po^m	$-\alpha$	311.9	2.8	4.17	m	$13/2^+$
	Rn	$-\alpha$	0		620	ms	$(3/2^-)$
	Rn^m	$-\alpha$	250#	110#	320	ms	$(13/2^+)$
200	Au	+	0		48.4	m	$1(^-)$
	Au^m	+	960	70	18.7	h	12^-
	At	$-\alpha$	0		43	s	(5^+)
	At^m	$-\alpha$	113	3	47	s	(7^+)
	At^n	IT	344	3	3.5	s	(10^-)
201	Po	$-\alpha$	0		15.3	m	$3/2^-$
	Po^m	IT	424.2	2.5	8.9	m	$13/2^+$
	Rn	$-\alpha$	0		7.0	s	$(3/2^-)$
	Rn^m	$-\alpha$	280#	110#	3.8	s	$(13/2^+)$
202	At	$+\alpha$	0		184	s	$(2,3)^+$
	At^m	IT	50#	50#	182	s	(7^+)
	At^n	IT	440#	50#	460	ms	(10^-)
	Fr	$-\alpha$	0		300	ms	(3^+)
	Fr^m	$-\alpha$	360	500	340	ms	(10^-)
203	Rn	$-\alpha$	0		45	s	$(3/2,5/2)^-$
	Rn^m	$-\alpha$	363	4	28	s	$13/2(^+)$
	Ra	$-\alpha$	0		3.3	ms	$(3/2^-$#)
	Ra^m	$-\alpha$	290#	120#	39	ms	$(13/2^+)$
204	Fr	$-\alpha$	0		1.7	s	(3^+)
	Fr^m	$-\alpha$	54	6	2.6	s	(7^+)
	Fr^n	$-\alpha$	330	6	1.6	s	(10^-)
205	Ra	$-\alpha$	0		220	ms	$(3/2^-$#)
	Ra^m	$-\alpha$	290#	120#	200	ms	$(13/2^+$#)
206	Fr	IT	0		15.9	s	$(2,3)^+$
	Fr^m	IT	50#	50#	15.9	s	(7^+)
	Fr^n	$-\alpha$	580#	50#	700	ms	(10^-)
	Fr^r		100	100	R = ?		spmix
207	Ra	$-\alpha$	0		1.3	s	$(5/2^-,3/2^-)$
	Ra^m	$-\alpha$	560	50	55	ms	$(13/2^+)$
208	Ac	$-\alpha$	0		99	ms	
	Ac^m	$-\alpha$	510	22	27	ms	
211	Po	$-\alpha$	0		516	ms	$9/2^+$
	Po^m	$-\alpha$	1462	5	25.2	s	$(25/2^+)$
212	Bi		0		60.55	m	$1(^-)$
	Bi^m	$-\alpha$	250	30	25.0	m	(9^-)
	Po		0		299	ns	0^+
	Po^m	$-\alpha$	2911	12	45.1	s	(18^+)
	At	$-\alpha$	0		314	ms	(1^-)
	At^m	$-\alpha$	222	7	119	ms	(9^-)
213	Ra	$-\alpha$	0		2.74	m	$1/2^-$
	Ra^m	$-\alpha$	1768	6	2.1	ms	$17/2^-$
214	At	$-\alpha$	0		558	ns	1^-
	At^p	$-\alpha$	59	9	268	ns	
	At^q	$-\alpha$	234	6	760	ns	9^-
	Fr	$-\alpha$	0		5.0	ms	(1^-)
	Fr^m	$-\alpha$	123	6	3.35	ms	(9^-)
216	Ac	$-\alpha$	0		330	μs	(1^-)
	Ac^p	$-\alpha$	37	10	330	μs	(9^-)
	Th	$-\alpha$	0		28	ms	0^+
	Th^p	$-\alpha$	2030	20	180	μs	8^+
217	Ac	$-\alpha$	0		69	ns	$9/2^-$
	Ac^p	$-\alpha$	2012	20	740	ns	$29/2^+$
	Pa	$-\alpha$	0		3.4	ms	$(9/2^-$#)
	Pa^m	$-\alpha$	1860	70	1.5	ms	
218	Fr	$-\alpha$	0		1.0	ms	(1^-)
	Fr^m	$-\alpha$	86	5	22.0	ms	
	Fr^p	IT	200#	150#			high
	Ac	$-\alpha$	0		1.12	μs	$(1)^-$
	Ac^p	IT	150#	50#			$(9)^-$
222	Ac	$-\alpha$	0		5.0	s	(1^-)
	Ac^m	$-\alpha$	200#	150#	1.05	m	high
224	Fr		0		3.30	m	$1(^-)$
	Fr^r		−440	100	contamination		
229	Pa	$-\alpha$	0		1.50	d	$(5/2^+)$
	Pa^p	+nn	15	9	420	ns	$3/2^-$
230	Np	$-\alpha$	0		4.6	m	
	Np^p	IT	300#	200#			am
234	Pa	IT	0		6.70	h	4^+
	Pa^m	−	78.0	3.0	1.17	m	(0^-)
235	Cm	$-\alpha$	0				
	Cm^p	IT	50*	50*			am
236	Np	IT	0		154	ky	(6^-)
	Np^m	+	60	50	22.5	h	1
	Np^p	$+\alpha$	240	50			3^-
237	Cm	$-\alpha$	0				
	Cm^p	IT	200#	150#			$7/2^-$
	Bk	$-\alpha$	0				$7/2^+$#
	Bk^p	IT	70*	30*			$(3/2^-)$
238	Bk	$-\alpha$	0				
	Bk^p	IT	200#	150#			am
239	Cm	−	0		~2.9	h	$(7/2^-)$
	Cm^p	IT	150*	100*			$1/2^+$
	Bk	$-\alpha$	0				$(7/2^+)$
	Bk^p	$+\alpha$	41	11			$(3/2^-)$
240	Np	+	0		61.9	m	(5^+)
	Np^m	IT	20	15	7.22	m	$1(^+)$
	Bk	−	0		4.8	m	
	Bk^p	IT	330#	100#			am
241	Cm		0		32.8	d	$1/2^+$
	Cm^p	IT	0#	100#			$(5/2^+)$
	Bk	−	0				$(7/2^+)$
	Bk^p	$+\alpha$	51	3			$3/2^-$
	Cf	$-\alpha$	0		3.78	m	$7/2^-$
	Cf^p	IT	150*	100*			$(1/2^+)$
	Es	$-\alpha$	0		10	s	
	Es^p	IT	400*	200*			$(7/2^+)$

A	Elt.	Orig.	Excitation energy (keV)		T		J^π
242	Np	IT	0		5.5	m	$(6)(^{+}\#)$
	Np^m	$+$	0#	50#	2.2	m	(1^+)
	Bk	$-$	0		7.0	m	2^-
	Bk^p	IT	250#	100#			4^-
	Es	$-\alpha$	0		50	s	
	Es^p	IT	300#	200#			
243	Np	IT	0		1.8	m	$(5/2^-)$
	Np^p	$+$p	50*	30*			$(5/2^-)$
	Cm	$-\alpha$	0		29.1	y	$5/2^+$
	Cm^p	$+\alpha$	127	9			$7/2^+$
	Bk	$-\alpha$	0		4.5	h	$(3/2^-)$
	Bk^p	IT	50*	30*			$(7/2^-)$
	Es	$-\alpha$	0		21	s	$(3/2^-)$
	Es^p	IT	400*	200*			am
244	Am		0		10.1	h	(6^-)
	Am^m		85.8	0.9	~26	m	1^+
	Bk	$-\alpha$	0		4.35	h	(1^-)
	Bk^p	IT	140#	50#			am
	Es	$-\alpha$	0		37	s	
	Es^p	IT	200#	150#			am
245	Bk	$-\alpha$	0		4.94	d	$3/2^-$
	Bk^p	IT	50*	30*			$(7/2^-)$
	Cf	$-\alpha$	0		45.0	m	$(5/2^+)$
	Cf^p	IT	150*	100*			$7/2^+$
	Es	$-\alpha$	0		1.1	m	$(3/2^-)$
	Es^p	IT	300#	100#			am
	Md	IT	0		900	μs	$(1/2^-)$
	Md^m	$-\alpha$	100#	100#	390	ms	$(7/2^+)$
246	Am	IT	0		39	m	(7^-)
	Am^m		30	10	25.0	m	$2(^-)$
	Es	$-\alpha$	0		7.7	m	$(4^-,6^+)$
	Es^p	IT	350#	200#			am
	Md	$-\alpha$	0		1.0	s	
	Md^m	$-\alpha$	210	70	1.0	s	
247	Es	$-\alpha$	0		4.55	m	$(7/2^+)$
	Es^p	IT	400*	200*			am
	Fm	$-\alpha$	0		35	s	
	Fm^p	IT	150*	100*			$(7/2^+)$
	Md	IT	0		270	ms	
	Md^m	$-\alpha$	50#	100#	1.12	s	$(7/2^+)$
248	Bk	IT	0		> 9	y	(6^+)
	Bk^m	$+$	30#	70#	23.7	h	$1(^-)$
	Bk^p	$+\alpha$	50#	50#			(5^-)
249	Fm	$-\alpha$	0		2.6	m	$(7/2^+)$
	Fm^p	IT	260#	200#			$(9/2^-)$
	Md	$-\alpha$	0		24	s	
	Md^p	IT	50*	30*			am
250	Bk	$+\alpha$	0		3.217	h	2^-
	Bk^p	$+\alpha$	84.1	2.1	213	μs	7^+
	Md	$-\alpha$	0		52	s	
	Md^p	IT	250#	150#			am
251	Md	$-\alpha$	0		4.0	m	
	Md^p	IT	50*	30*			am
	No	$-\alpha$	0		800	ms	$(7/2^+)$
	No^p	IT	400*	100*			$(9/2^+)$
252	Md	x	0		2.3	m	
	Md^p	IT	100#	100#			am
253	Md	x	0		~10	m	
	Md^p	IT	50*	30*			am
	No	$-\alpha$	0		1.7	m	$(9/2^-)$
	No^p	IT	400#	100#			$(1/2^+)$
	Lr	$-\alpha$	0		1.5	s	
	Lr^p	IT	190#	50#			
254	Es	$-\alpha$	0		275.7	d	(7^+)
	Es^m	$+$	83.8	2.5	39.3	h	2^+
	Lr	$-\alpha$	0		13	s	
	Lr^p	IT	100#	70#			
255	Fm	$-\alpha$	0		20.07	h	$7/2^+$
	Fm^p	IT	250*	100*			$(9/2^+)$
	Md	$-\alpha$	0		27	m	$(7/2^-)$
	Md^p	IT	100*	70*			am
	No	$-\alpha$	0		3.1	m	$(1/2^+)$
	No^p	IT	100*	70*			$(7/2^+)$
256	Md	$-\alpha$	0		78.1	m	$(0^-,1^-)$
	Md^p	IT	150#	100#			am
	Lr	$-\alpha$	0		28	s	
	Lr^p	IT	100	70			
257	No	$-\alpha$	0		25	s	$(7/2^+)$
	No^p	IT	250*	100*			am
	Lr	$-\alpha$	0		646	ms	$(9/2^+)$
	Lr^p	IT	150#	100#			am
	Db	$-\alpha$	0		4.7	s	$(1/2^+)$
	Db^p	IT	100*	70*			$(7/2^+)$
258	Lr	$-\alpha$	0		3.92	s	
	Lr^p	IT	200#	150#			am
	Jl	$-\alpha$	0		4.6	s	
	Jl^p	IT	0#	150#			am
259	No	$-\alpha$	0		58	m	$(9/2^+)$
	No^p	IT	280#	150#			
	Lr	$-\alpha$	0		6.34	s	
	Lr^p	IT	350*	150*			
	Db	$-\alpha$	0		3.1	s	$(7/2^{+}\#)$
	Db^p	IT	100*	70*			$(3/2^+)$
	Db^q	$+\alpha$	210*	110*			$(9/2^+)$
260	Jl	$-\alpha$	0		1.52	s	
	Jl^p	IT	200#	150#			
261	Db	$-\alpha$	0		65	s	$(3/2^+,9/2^+)$
	Db^p	IT	100*	70*			am
	Rf	$-\alpha$	0		230	ms	$(7/2^+)$
	Rf^p	IT	100*	70*			$(3/2^+)$
	Rf^q	$+\alpha$	−60#	130#			$(9/2^+)$
262	Bh	$-\alpha$	0		102	ms	
	Bh^m	$-\alpha$	320#	160#	8.0	ms	
263	Rf	IT	0		800	ms	$(9/2^+)$
	Rf^m	$-\alpha$	100*	70*	350	ms	$(3/2^{+}\#)$
	Hn	$-\alpha$	0		1.8	ms	
	Hn^p	IT	0#	100#			am
264	Bh	$-\alpha$	0		700	ms	
	Bh^p	IT	300#	150#			am
265	Hn	IT	0		1.6	ms	$(9/2^{+}\#)$
	Hn^m	$-\alpha$	400#	100#	1.2	ms	$(3/2^{+}\#)$
267	Hn	$-\alpha$	0		50	ms	$(3/2^{+}\#)$
	Hn^p	IT	0#	150#			$(11/2^{-}\#)$
	Hn^q	$+\alpha$	530#	340#			am
268	Mt	$-\alpha$	0		110	ms	
	Mt^p	IT	250#	100#			
269	Hn	$-\alpha$	0				
	Hn^p	IT	150#	100#			
271	Xa	$-\alpha$	0		1.2	ms	$(11/2^{-}\#)$
	Xa^m	IT	500#	300#	180	ms	

Table III. Input data compared with adjusted values

(an update of the table given in ref. [IV])

EXPLANATION OF TABLE

The ordering is in groups according to highest occurring relevant mass number.

Item	In mass-doublet equation: H =^{1}H, N =^{14}N, D =^{2}H, O =^{16}O, C =^{12}C	In mass-triplet equation: Rb^x, Rb^y: different mixtures of two isomers, see table II.	In nuclear reaction: K^m, Cs^m, Cs^n: upper isomers, see table II.
Input value	Mass doublet: value and its standard error in μu. Triplet: value and its standard error in keV. Reaction: value and its standard error in keV. The value is the combination of mass excesses $\Delta(M-A)$ given under 'item'. It is the author's experimental result and the author's stated uncertainty, except in a few cases for which comments are given and for some α-reactions where the errors have been increased to 50 keV (see [IV], Section 10).		
Adjusted value	Output of calculation. For secondary data (Dg = 2–20) the adjusted value is the same as the input value and not given; also, the adjusted value is only given once for a group of results for the same reaction or doublet. Values and errors were rounded off, but not to more than tens of keV. # Value and error derived not from purely experimental data, but at least partly from systematic trends.		
v/s	Deviation between input and adjusted value, given as their difference divided by the input error.		
Dg (see [IV], Section 3)	1	Primary data.	
	2–20	Secondary data of different degrees.	
	B	Well-documented data which disagree with other well-documented values.	
	C	Data from incomplete reports, at variance with other data.	
	D	Data not checked by other ones and at variance with systematics, replaced by a recommended value (see Section 9).	
	F	Study of paper raises doubts about validity of data within the reported error.	
	R	Item replaced for computational reasons by an equivalent one giving same result.	
	U	Data with much less weight than that of a combination of other data.	

Sig	*Significance* (×100) of primary data only (see [IV], Section 4).
Main flux	Largest *influence* (×100) and nucleus to which the data contributes the most (see [IV], Section 4).
Lab	Identifies group which measured the corresponding item. Example of Lab key: MA3 Penning Trap data of Mainz-Isolde group. The numbers refer to different papers or even to groups of data within one paper.
CF	Consistency factor. The standard error given in the Input value column has been multiplied by this factor before being used in the least-squares adjustment.
Reference	Reference keys:

89Sh10	Results derived from regular journal. These keys are copied from Nuclear Data Sheets. Where not yet available, the style 95Me.1 has been used.
84Sc.A	Result from abstract, preprint, private communication, conference, thesis or annual report.
*	A remark on the corresponding item is given below the block of data corresponding to the same (highest) A.
Z	recalibrations of 91Ry01 for α particles, 90Wa22 for γ in (n,γ) and (p,γ) reactions and 91Wa.A for protons and γ in (p,γ) reactions (see [IV], Section 2).

Remarks. For data indicated with a star in the reference column, remarks have been added. They are collected in groups at the end of each block of data in which the highest occurring relevant mass number is the same. They give:

(i) Information explaining how the values in column 'Input value' have been derived for papers not mentioning e.g. the mass differences as derived from measured ratios of voltages or frequencies - a bad practice - or the reaction energies or values for transitions to excited states in the final nuclei (for which better values of the excitation energies are now known).

(ii) Reasons for changing values (e.g. recalibrations) or errors as given by the authors or for rejecting them (i.e. for labelling them B, C or F).

(iii) Value suggested by systematical trends and recommended in this evaluation as best estimate (see Section 9).

(iv) Separate values for capture ratios (see [IV], Section 6).

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
π^+		140080.95	.35	140080.9	0.4	.0	1	100	100 π^+			94PaDG	
H_2-D		1548.302	.012	1548.2863	0.0007	−.5	U			OH1	2.5	93Go37	
$^3H(\beta^-)^3He$		18.597	.014	18.5906	0.0009	−.5	U					95Hi.1	
$^4H(\gamma,n)^3H$		2300	300	2910	110	2.0	2					95Al.A	
$^5H(\gamma,2n)^3H$		5200	400	5740	950	1.4	2					95Al.A	
		4200	400			3.9	C					95Se.A	
$^7Li(n,\gamma)^8Li$		2032.78	.15	2032.80	0.12	.1	–					74Ju.A	*
		2032.84	.2			−.2	–			ORn		91Ly01	Z
	ave.	2032.80	0.12			.0	1	100	100 ^8Li			average	
$*^7Li(n,\gamma)^8Li$	PrvCom to ref.											74AjLa	**
$^{10}He(\gamma,2n)^8He$		1200	300	1070	70	−.4	U					94Ko16	
$^{10}Li(\gamma,n)^9Li$		150	150	25	15	−.8	U					90Am05	*
		25	15				2					95Zi.1	*
$^{10}Li^p(\gamma,n)^9Li$		240	60				2					95Bo.A	*
$^9Be(^9Be,^8B)^{10}Li$		−34060	250	−33276	15	3.1	F			Brk		75Wi26	*
$^9Be(^{13}C,^{12}N)^{10}Li^q$		−36370	50	−36390	40	−.5	1	61	61 $^{10}Li^q$	Ber		93Bo03	*
$^{10}Be(^{14}C,^{14}O)^{10}He$		−41190	70				2			Ber		94Os04	
$*^{10}Li(\gamma,n)^9Li$	From $^{11}B(\pi^-,p)^{10}Li$											GAu	**
$*^{10}Li(\gamma,n)^9Li$	Resonance less than 50 above the one neutron threshold, but											95Zi.1	**
*	could also be final state interaction; then ^{10}Li would be 200 higher											95Bo.A	**
$*^{10}Li^p(\gamma,n)^9Li$	From $^{10}Be(^{12}C,^{12}N)^{10}Li^p$ (1^+ level)											GAu	**
$*^9Be(^9Be,^8B)^{10}Li$	F: definitively to a higher level											GAu	**
$*^9Be(^{13}C,^{12}N)^{10}Li^q$	Revised with Breit–Wigner line shape (probably 2^+ level)											95Bo.A	**
$^{11}B(^7Li,^8B)^{10}Li$		−32431	80	−32396	15	.4	U			MSU		94Yo01	*
$^{11}B(^7Li,^8B)^{10}Li^q$		−32908	62	−32870	40	.6	1	39	39 $^{10}Li^q$	MSU		94Yo01	
$^{11}B(^{14}C,^{14}O)^{11}Li$		−37120	35	−37114	27	.2	–			MSU		93Yo07	
$^{11}B(\pi^-,\pi^+)^{11}Li$	ave.	−33144	29	−33150	27	−.2	1	89	89 ^{11}Li			average	
$*^{11}B(^7Li,^8B)^{10}Li$	Original (> −32471) re-evaluated											GAu	**
*	Existence of this level not completely certain											94Yo01	**
$^{10}B(^3He,p)^{12}C$		19692.86	.44	19693.0	0.4	.3	–			Mun		83Ch08	*
$^{10}B(\alpha,d)^{12}C$	ave.	1339.9	0.4	1340.0	0.4	.1	1	92	92 ^{10}B			average	
$^{12}O(2p)^{10}C$		1770	20	1771	18	.1	3					95Kr03	
$*^{10}B(^3He,p)^{12}C$	Original Q = 15305.45(.3) revised by authors to 15253.95(31)											83Vo.A	**
*	to 4438.91(.31) level											90AjSe	**
$C\ D-^{13}C\ H$		2921.9086	.0012	2921.9080	0.0009	−.5	1	57	56 ^{13}C	MI1	1.0	94Di.A	
		2921.9074	.0015			.4	1	37	36 ^{13}C	MI1	1.0	94Di.A	
$^{13}Be^p(IT)^{13}Be$		1500	500				3					94De32	
$^{13}C(^{14}C,^{14}O)^{13}Be^p$		−37020	50				2			Ber		92Os04	
$C\ H_2-N$		12576.0598	.0008	12576.0590	0.0006	−.9	1	62	51 ^{14}N	MI1	1.0	94Di.A	
$^{14}C(^{14}C,^{14}O)^{14}Be^p$		−43440	60				2			Ber		95Bo10	
$C\ D\ H-^{15}N$		21817.9119	.0008	21817.9117	0.0007	−.3	1	75	75 ^{15}N	MI1	1.0	94Di.A	
$C\ H_3-^{15}N$		23366.1979	.0017	23366.1980	0.0009	.1	1	27	18 ^1H	MI1	1.0	94Di.A	
$^{14}N(n,\gamma)^{15}N$		10833.315	.021	10833.3016	0.0023	−.6	U					94Ju.A	
$C\ H_4-O$		36385.5073	.0019	36385.5065	0.0009	−.4	1	21	16 ^{16}O	MI1	1.0	94Di.A	
		36385.5060	.0022			.2	1	16	12 ^{16}O	MI1	1.0	94Di.A	
$N_2-C\ O$		11233.3909	.0022	11233.3884	0.0014	−1.1	1	38	26 ^{14}N	MI1	1.0	94Di.A	
$^{14}C(^{14}C,^{12}N)^{16}B$		−48380	60				2			Ber		95Bo10	

Item	Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference
$^{16}O(^{3}He,n)^{18}Ne$	−3183.9	1.5				2					94Ma14
$C\ D_4-{}^{20}Ne$	63966.9329	.0026	63966.9361	0.0017	1.2	1	44	35 ^{20}Ne	MI1	1.0	94Di.A
$O\ D_2-{}^{20}Ne$	30677.497	.067	30678.0022	0.0021	3.0	B			OH1	2.5	93Go38
$^{22}Ne-{}^{20}Ne$	−1056.415	.290	−1054.67	0.23	2.4	B			OH1	2.5	93Go38
$^{26}Mg(p,n)^{26}Al$	−4786.25	.12	−4786.49	0.06	−2.0	-			Auc		94Br11 *
	ave. −4786.14	0.09			−3.8	1	39	29 ^{26}Al			average
$*{}^{26}Mg(p,n)^{26}Al$	T = 5209.46(.12) to $^{26}Al^{m}$ at 228.305										90Endt **
$^{27}Al(p,n)^{27}Si$	−5594.76	.10				2			Auc		94Br37
$^{28}Si-C_{2.333}$	−23073.43	.30	−23073.4673	0.0020	−.1	U			ST1	1.0	93Je06
	−23073.00	.27			−.7	U			OH1	2.5	94Go.A
$C_2\ D_2-{}^{28}Si$	51277.0224	.0024	51277.0232	0.0018	.4	1	58	58 ^{28}Si	MI1	1.0	94Di.A
$^{15}N_2-{}^{28}Si\ H_2$	7641.2007	.0024	7641.1999	0.0018	−.4	1	58	42 ^{28}Si	MI1	1.0	94Di.A
$^{27}Al(p,\gamma)^{28}Si^{r}$	−956.035	.020	−956.06	0.06	−2.0	2			Auc		94Br37
$^{33}S(p,\gamma)^{34}Cl$	5143.30	.05				2			Auc		94Li20
$^{34}S(p,n)^{34}Cl$	−6273.11	.25	−6273.64	0.07	−2.3	B			Auc		92Ba.A *
$*{}^{34}S(p,n)^{34}Cl$	Provisional; not yet corrected for atomic excitation processes										92Ba.A **
*	disturbed by resonance; at least .5 uncertain										94Li20 **
$^{34}S(p,\gamma)^{35}Cl$	6370.39	.20	6370.63	0.09	1.2	R			Oak		83Ra04
$^{35}S(\beta^-)^{35}Cl$	167.35	.10	167.14	0.08	−2.1	B					93Ab11 *
	167.23	.10			−.9	B					93Be21 *
	167.222	.095			−.9	-					Averag *
	ave. 167.15	0.09			−.1	1	97	96 ^{35}S			average
$*{}^{35}S(\beta^-)^{35}Cl$	Adopted: simple average and dispersion of 9 data										GAu **
$^{40}Ar(d,{}^{3}He)^{39}Cl-{}^{36}Ar()^{35}Cl$	−4024.1	2.4	−4022.3	1.7	.7	1	52	52 ^{39}Cl	Hei		93Ma50
$^{50}V(n,p)^{50}Ti$	2984	10	2990.7	1.1	.7	U			ILL		94Wa17
$^{51}Ca-C_{4.25}$	−38800	350	−38530	100	.8	B			TO3	1.0	90Tu01 *
$*{}^{51}Ca-C_{4.25}$	B: "the new data set is the superior": do not use TO3 where TO5 exist										94Sc12 **
$^{55}Fe(\epsilon)^{55}Mn$	231.0	1.0	231.38	0.10	.4	U					93Wi05 *
	231.37	.10			.1	1	99	72 ^{55}Mn			95Da14
$*{}^{55}Fe(\epsilon)^{55}Mn$	Error estimate by compiler										AHW **
$^{60}Ni(n,\gamma)^{61}Ni$	7820.07	.20	7820.00	0.13	−.4	-			ILn		93Ha05
	ave. 7819.92	0.13			.6	1	98	74 ^{61}Ni			average
$^{63}Ni(\beta^-)^{63}Cu$	66.9459	.0054	66.945	0.005	−.1	1	100	82 ^{63}Ni			93Oh02
$^{65}Cu(p,n)^{65}Zn$	−2134.8	0.8	−2134.3	0.3	.7	-			Yal		69Ov01
	ave. −2133.8	0.4			−1.2	1	84	61 ^{65}Cu			average
$^{70}Cu^{m}(IT)^{70}Cu$	140	80				3					75Re09
$^{70}Cu^{m}(\beta^-)^{70}Zn$	6360	110	6740	80	3.4	B					75Re09
$^{71}Ge(\epsilon)^{71}Ga$	233.0	.5	231.9	0.3	−2.2	-			Hei		84Ha.A
	232.1	.5			−.4	-					93Di03 *
	ave. 232.2	0.3			−.8	1	89	80 ^{71}Ga			average
$*{}^{71}Ge(\epsilon)^{71}Ga$	Original error 0.1 increased for calibration uncertainty										GAu **

Item	Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference
$^{73}\mathrm{Br}(\beta^+)^{73}\mathrm{Se}$	4688	140	4680	130	.0	3					87He21 *
$*^{73}\mathrm{Br}(\beta^+)^{73}\mathrm{Se}$	E^+ = 3640(140) to $^{73}\mathrm{Se}^m$ at 25.71										NDS **
$^{74}\mathrm{Br}(\beta^+)^{74}\mathrm{Se}$	6857	100	6907	15	.5	U					69La15 *
$*^{74}\mathrm{Br}(\beta^+)^{74}\mathrm{Se}$	E^+ = 5200(100), 4500(100) to 634.76, 1363.21 levels										69La15 **
*	from $^{74}\mathrm{Br}^m$ at 13.8(.5)										93Do05 **
$^{78}\mathrm{Se}(n,\gamma)^{79}\mathrm{Se}$	6962.6	.3	6962.58	0.28	−.1	2					79Br.A *
$*^{78}\mathrm{Se}(n,\gamma)^{79}\mathrm{Se}$	From γ's to 95.77, 527.93, 1088.65 levels (,Z)										NDS **
$^{82}\mathrm{As}(\beta^-)^{82}\mathrm{Se}$	7270	200				2					70Va31
$^{82}\mathrm{As}^m(\beta^-)^{82}\mathrm{Se}$	6600	200	7519	25	4.6	F					70Ka04
$^{82}\mathrm{Se}(t,{}^3\mathrm{He})^{82}\mathrm{As}^m$	−7500	25				2			LAl		79Aj02
$^{84}\mathrm{As}(\beta^-)^{84}\mathrm{Se}$	7195	200	9870#	300#	13.4	F			Trs		94Gi07 *
$^{84}\mathrm{Br}^m(\beta^-)^{84}\mathrm{Kr}$	4970	100				2					70Ha21
$^{84}\mathrm{Y}(\beta^+)^{84}\mathrm{Sr}$	6499	135	6490	90	−.1	2			BNL		81Li12
	6475	124			.1	2					82De36
$^{84}\mathrm{Y}^m(\beta^+)^{84}\mathrm{Sr}$	6409	170				2			BNL		81Li12
$*^{84}\mathrm{As}(\beta^-)^{84}\mathrm{Se}$	Observed (β^-n) decay implies $Q\beta > 8681(15)$										93Ru01 **
$^{86}\mathrm{Kr}-\mathrm{C}_{7.167}$	−89389.9	1.2	−89389.7	1.2	.2	1	95	95 $^{86}\mathrm{Kr}$	ST1	1.0	95Ca.A
$^{86}\mathrm{Mo}(\beta^+)^{86}\mathrm{Nb}$	5270	430				4					94Sh07 *
$*^{86}\mathrm{Mo}(\beta^+)^{86}\mathrm{Nb}$	E^+ = 4000(400) to $(0^+,1^+,2^+)$ level at estimated 250(160)										94Sh07 **
$^{87}\mathrm{Nb}(\beta^+)^{87}\mathrm{Zr}$	5165	60				3					82De43 *
$^{87}\mathrm{Mo}(\beta^+)^{87}\mathrm{Nb}$	6382	308	6490	210	.3	4					82De43 *
	6589	300			−.3	4					91Mi15 *
$*^{87}\mathrm{Nb}(\beta^+)^{87}\mathrm{Zr}$	Q^+ = 5169(60) from $^{87}\mathrm{Nb}^m$ at 3.9(.1)										91Ju05 **
$*^{87}\mathrm{Mo}(\beta^+)^{87}\mathrm{Nb}$	Q^+ = 6378(308)) to $^{87}\mathrm{Nb}^m$ at 3.9(.1)										91Ju05 **
$*^{87}\mathrm{Mo}(\beta^+)^{87}\mathrm{Nb}$	E^+ = 5300(300) to level 262.7 above $^{87}\mathrm{Nb}^m$ at 3.9(.1)										91Ju05 **
$^{88}\mathrm{Rb}-{}^{85}\mathrm{Rb}_{1.035}$	2615	9	2617	4	.2	1	24	21 $^{88}\mathrm{Rb}$	MA4	1.0	95Ha.1
$^{88}\mathrm{Rb}(\beta^-)^{88}\mathrm{Sr}$	5318	9	5313	4	−.5	–			Gsn		80De02 *
ave.	5314	4			−.2	1	78	77 $^{88}\mathrm{Rb}$			average
$*^{88}\mathrm{Rb}(\beta^-)^{88}\mathrm{Sr}$	Original error 4 corrected by ref										94Ha.A **
$^{89}\mathrm{Rb}-{}^{85}\mathrm{Rb}_{1.047}$	4628	9	4636	6	.9	1	43	41 $^{89}\mathrm{Rb}$	MA4	1.0	95Ha.1
$^{89}\mathrm{Rb}(\beta^-)^{89}\mathrm{Sr}$	4510	9	4496	5	−1.5	–			Gsn		80De02 *
ave.	4501	7			−.7	1	57	57 $^{89}\mathrm{Rb}$			average
$*^{89}\mathrm{Rb}(\beta^-)^{89}\mathrm{Sr}$	Original error 8 corrected by ref										94Ha.A **
$^{90}\mathrm{Rb}-{}^{85}\mathrm{Rb}_{1.059}$	8211	14	8224	8	.9	1	37	35 $^{90}\mathrm{Rb}$	MA4	1.0	95Ha.1 *
$^{90}\mathrm{Y}(\beta^-)^{90}\mathrm{Zr}$	2273	5	2280.1	1.6	1.4	–					64La13
ave.	2279.2	2.0			.4	1	62	40 $^{90}\mathrm{Y}$			average
$^{90}\mathrm{Tc}(\beta^+)^{90}\mathrm{Mo}$	9130	410	8960	240	−.4	4					74Ia01 *
$^{90}\mathrm{Tc}^m(\beta^+)^{90}\mathrm{Mo}$	9270	300				4					81Ox01
$*^{90}\mathrm{Rb}-{}^{85}\mathrm{Rb}_{1.059}$	From original 8326(9) from $^{90}\mathrm{Rb}^m$ at 106.90 $M-A=-79257(9)$										NDS **
*	original error (9) + 10 for possible weak ground-state mixture										GAu **
$*^{90}\mathrm{Tc}(\beta^+)^{90}\mathrm{Mo}$	$E^+ \approx 7900(400)$ to ground-state (22%) and 948.11 (77%) level										NDS **
$^{91}\mathrm{Rb}-{}^{85}\mathrm{Rb}_{1.071}$	11003	10	11008	8	.5	1	71	70 $^{91}\mathrm{Rb}$	MA4	1.0	95Ha.1
$^{91}\mathrm{Sr}-{}^{85}\mathrm{Rb}_{1.071}$	4702	9	4683	6	−2.1	1	47	44 $^{91}\mathrm{Sr}$	MA4	1.0	95Ha.1
$^{91}\mathrm{Rb}(\beta^-)^{91}\mathrm{Sr}^r$	5850	20	5852	8	.1	–			McG		83Ia02
	5860	10			−.8	–			Gsn		92Pr03
ave.	5858	9			−.7	1	86	74 $^{91}\mathrm{Sr}^r$			average
$^{91}\mathrm{Sr}^r(\mathrm{IT})^{91}\mathrm{Sr}$	70	20	39	11	−1.5	1	32	26 $^{91}\mathrm{Sr}^r$			AHW *

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
$^{91}\mathrm{Sr}(\beta^-)^{91}\mathrm{Y}$		2669	10	2707	6	3.8	B					53Am08	
		2684	4			5.8	B					73Ha11	
		2704	8			.4	B			Gsn		80Dc02	*
		2709	15			−.1	B			McG		83Ia02	
		2691	9			1.8	1	43	39 ^{91}Sr			Averag	*
$^{91}\mathrm{Y}(\beta^-)^{91}\mathrm{Zr}$		1545	5	1544.8	1.8	.0	–					64La13	
	ave.	1544.1	1.9			.4	1	98	95 ^{91}Y			average	
$^{91}\mathrm{Mo}(\beta^+)^{91}\mathrm{Nb}$		4435	23	4434	11	.0	R					93Os06	
*$^{91}\mathrm{Sr}^{r}(\mathrm{IT})^{91}\mathrm{Sr}$		β feeding in ^{91}Sr: < 8% of ground-state and 25% of 93.628 level										NDS	**
*$^{91}\mathrm{Sr}(\beta^-)^{91}\mathrm{Y}$		Original error 3 corrected by ref										94Ha.A	**
*$^{91}\mathrm{Sr}(\beta^-)^{91}\mathrm{Y}$		Adopted: simple average and dispersion of 4 data										GAu	**
$^{92}\mathrm{Rb}-^{85}\mathrm{Rb}_{1.082}$		15176	9	15169	7	−.7	1	57	56 ^{92}Rb	MA4	1.0	95Ha.1	
$^{92}\mathrm{Sr}-^{85}\mathrm{Rb}_{1.082}$		6482	9	6474	7	−.9	1	59	58 ^{92}Sr	MA4	1.0	95Ha.1	
$^{93}\mathrm{Rb}-^{85}\mathrm{Rb}_{1.094}$		18549	10	18535	8	−1.4	1	62	61 ^{93}Rb	MA4	1.0	95Ha.1	
$^{93}\mathrm{Sr}-^{85}\mathrm{Rb}_{1.094}$		10526	10	10525	8	−.1	1	65	64 ^{93}Sr	MA4	1.0	95Ha.1	
$^{94}\mathrm{Rb}-^{85}\mathrm{Rb}_{1.106}$		23958	10	23968	9	1.0	1	78	77 ^{94}Rb	MA4	1.0	95Ha.1	
$^{94}\mathrm{Sr}-^{85}\mathrm{Rb}_{1.106}$		12924	10	12921	8	−.3	1	60	58 ^{94}Sr	MA4	1.0	95Ha.1	
$^{94}\mathrm{Sr}(\beta^-)^{94}\mathrm{Y}$		3512	10	3508	8	−.4	1	62	32 ^{94}Y	Gsn		80Dc02	*
$^{94}\mathrm{Y}(\beta^-)^{94}\mathrm{Zr}$		4920	9	4917	7	−.4	1	69	68 ^{94}Y	Gsn		80Dc02	*
*$^{94}\mathrm{Sr}(\beta^-)^{94}\mathrm{Y}$		Original error 6 corrected by ref										94Ha.A	**
*$^{94}\mathrm{Y}(\beta^-)^{94}\mathrm{Zr}$		Original error 5 corrected by ref										94Ha.A	**
$^{95}\mathrm{Sr}-^{85}\mathrm{Rb}_{1.118}$		17987	10	17978	8	−.9	1	65	62 ^{95}Sr	MA4	1.0	95Ha.1	
$^{95}\mathrm{Y}(\beta^-)^{95}\mathrm{Zr}$		4445	9	4453	7	.9	1	69	67 ^{95}Y	Gsn		80Dc02	*
*$^{95}\mathrm{Y}(\beta^-)^{95}\mathrm{Zr}$		Original error 5 corrected by ref										94Ha.A	**
*		Q^- = 4417(10) given by same group, not used										84Bl.A	**
$^{96}\mathrm{Sr}(\beta^-)^{96}\mathrm{Y}$		5413	22	5387	15	−1.2	–			Gsn		80Dc02	*
	ave.	5376	15			.7	1	92	73 ^{96}Sr			average	
*$^{96}\mathrm{Sr}(\beta^-)^{96}\mathrm{Y}$		Original error 20 corrected by ref										94Ha.A	**
*		Q^- = 5362(10) given by same group, not used										84Bl.A	**
$^{98}\mathrm{Rh}(\beta^+)^{98}\mathrm{Ru}$		5151	50	5057	10	−1.9	U					94Ba06	
$^{99}\mathrm{Rh}(\beta^+)^{99}\mathrm{Ru}$		2038	10	2043	7	.5	–					52Sc11	*
		2053	10			−1.0	–					59To.A	
		2110	40			−1.7	U					74An23	
	ave.	2045	7			−.4	1	95	94 ^{99}Rh			average	
$^{99}\mathrm{Pd}(\beta^+)^{99}\mathrm{Rh}$		3410	20	3387	15	−1.2	1	57	51 ^{99}Pd			69Ph01	*
*$^{99}\mathrm{Rh}(\beta^+)^{99}\mathrm{Ru}$		E^+ = 740(10) from $^{99}\mathrm{Rh}^m$ at 64.3 to 340.73 level										NDS	**
*$^{99}\mathrm{Pd}(\beta^+)^{99}\mathrm{Rh}$		E^+ = 2180(20), 1930(20), 1510(20)										69Ph01	**
*		to 200.4, 464.0, 874.1 levels above 1/2$^-$ level (now ground-state)										NDS	**
$^{100}\mathrm{Cd}-\mathrm{C}_{8.333}$		−79880	240	−79770	100	.5	1	19	19 ^{100}Cd	CS1	1.0	95Le.B	
$^{100}\mathrm{In}-\mathrm{C}_{8.333}$		−69010	450	−68850	410	.4	1	83	83 ^{100}In	CS1	1.0	95Le.B	
$^{100}\mathrm{Ag}(\beta^+)^{100}\mathrm{Pd}$		7075	90	7050	80	−.3	–					79Vc.A	*
		7022	200			.1	–					80Ha20	*
	ave.	7070	80			−.2	1	89	88 ^{100}Ag			average	
$^{100}\mathrm{In}(\beta^+)^{100}\mathrm{Cd}$		10900	930	10170	390	−.8	1	18	17 ^{100}In	Lvp		95Sz01	*
$^{100}\mathrm{Sn}(\beta^+)^{100}\mathrm{In}$		5220	800	7270#	200#	2.6	C					95He.A	
*$^{100}\mathrm{Ag}(\beta^+)^{100}\mathrm{Pd}$		From 5$^+$ ground state to 2920.4 high spin level										79Vc.A	**
*$^{100}\mathrm{Ag}(\beta^+)^{100}\mathrm{Pd}$		E^+ = 5350(200) from $^{100}\mathrm{Ag}^m$ at 15.52 to 665.57 2$^+$ level										NDS	**
*$^{100}\mathrm{In}(\beta^+)^{100}\mathrm{Cd}$		From lower and upper limits 9300–12500										GAu	**

Item	Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference
^{102}Ag(β^+)^{102}Pd	5800	200	5950	70	.8	F					67Ch05 *
	4910	140			7.5	C					70Be.A *
^{102}In(β^+)^{102}Cd	9250	380				4			Lvp		95Sz01 *
*^{102}Ag(β^+)^{102}Pd	F: E^+ = 2260(40) does not fit with later decay scheme										NDS **
*^{102}Ag(β^+)^{102}Pd	Q^+ = 4920(140) from ^{102}Ag^m at 9.3										NDS **
*^{102}In(β^+)^{102}Cd	From determined upper 9900 and lower 8600 limits										GAu **
^{105}Sb(p)^{104}Sn	482.6	15.				5					94Ti03
^{106}Te(α)^{102}Sn	4290.2	9.	4293	9	.3	3					94Pa11
^{107}Te(α)^{103}Sn	3982.2	15.	4008	5	1.7	3					79Sc22
	4011.3	5.			−.6	3					91He21
^{108}I(α)^{104}Sb	4100	50				5					94Pa12
^{108}Mo(β^-)^{108}Tc	5100	60	4750#	150#	−5.8	D					95Jo02 *
*^{108}Mo(β^-)^{108}Tc	Systematical trends suggest ^{108}Mo 370 more bound										GAu **
^{110}I(α)^{106}Sb	3590	50	3580	50	−.1	7					91He21
^{111}I(α)^{107}Sb	3290	50	3280	50	−.2	3					92He.A
^{111}Xe(α)^{107}Te	3720	50	3720	50	−.1	4					91He21
^{112}Xe(α)^{108}Te	3335.4	7.	3330	6	−.7	6					94Pa11
^{112}Cs(p)^{111}Xe	814.3	7.				5					94Pa12
^{113}Cs(p)^{112}Xe	982.7	4.	973.5	2.6	−2.3	7					92He.A
	967.6	6.			1.0	7					94Pa12
^{114}Ba(γ,^{12}C)^{102}Sn	18110	780	19050#	200#	1.2	F					95Gu01 *
*^{114}Ba(γ,^{12}C)^{102}Sn	Most probably background										GAu **
^{115}Te^m(IT)^{115}Te	10	7				5					NDS *
*^{115}Te^m(IT)^{115}Te	From uniform distribution of probability ranging 0–20 keV										GAu **
^{116}Sb^m(β^+)^{116}Sn	5090	40				2					60Je03
^{116}Cs^x(IT)^{116}Cs	5	4	5	4	.0	1	100	65 ^{116}Cs^x			86Au02 *
*^{116}Cs^x(IT)^{116}Cs	Original 24(19) corrected for new estimated IT = 100(60)#										GAu **
^{117}Cs^x − ^{133}Cs$_{.880}$	11900	21				2			MA4	1.0	95Bo.1
^{117}Ag(β^-)^{117}Cd	4160	50				3			Stu		82Al29 *
^{117}I(β^+)^{117}Te	4610	110	4670	70	.5	–					70Be.A *
ave.	4650	70			.3	1	87	87 ^{117}I			average
*^{117}Ag(β^-)^{117}Cd	Q^- = 4260(110); and 4170(50) from ^{117}Ag^m at 28.6										NDS **
*^{117}I(β^+)^{117}Te	Q^+ = 4310(100) assumed to 274, 325 level										AHW **
^{118}Cs($\epsilon\alpha$)^{114}Te	11100	500	11080#	200#	.0	D					78Da07 *
^{118}Ag(β^-)^{118}Cd	7122	100	7140	60	.2	3			Stu		82Al29 *
	7110	470			.1	U			Stu		82Al29 *
	7155	76			−.2	3					95Ap.A
^{118}In^m(β^-)^{118}Sn	4270	100	4520#	50#	2.5	B					64Ka10
^{118}Cs^x(IT)^{118}Cs	5	4				2					82Au01 *
*^{118}Cs($\epsilon\alpha$)^{114}Te	Systematical trends suggest ^{114}Te 410 more bound										GAu **
*^{118}Ag(β^-)^{118}Cd	E^- = 4330(240), 3960(170), 3810(150)										GAu **
*	to 2788.75, 3224.37, 3265.70 levels, reinterpreted										95Ap.A**
*^{118}Ag(β^-)^{118}Cd	E^- = 3990(720), 3910(630)										NDS **
*	from ^{118}Ag^m at 127.49(.05) to 3181.72, 3381.8 levels, reinterpreted										95Ap.A**
*^{118}Cs^x(IT)^{118}Cs	Original 24(19) corrected for new estimated IT = 100(60)#										GAu **

Item	Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference
$^{119}\mathrm{Cs}^x-{}^{133}\mathrm{Cs}_{.895}$	7012	13	7013	9	.1	–			MA4	1.0	95Bo.1
	ave. 7015	9			−.2	1	97	97 $^{119}\mathrm{Cs}^x$			average
$^{119}\mathrm{Cs}^x(\mathrm{IT})^{119}\mathrm{Cs}$	16	11	16	11	.0	1	100	100 $^{119}\mathrm{Cs}$			82Au01 *
$*^{119}\mathrm{Cs}^x(\mathrm{IT})^{119}\mathrm{Cs}$	Original 33(22) corrected for new estimated IT = 50(30)#										GAu **
$^{120}\mathrm{Cs}^x-{}^{133}\mathrm{Cs}_{.902}$	5983	17	5970	9	−.7	–			MA4	1.0	95Bo.1
	ave. 5965	10			.6	1	89	89 $^{120}\mathrm{Cs}^x$			average
$^{120}\mathrm{Cs}(\epsilon\alpha)^{116}\mathrm{Te}$	9200	300	8990	90	−.7	1	9	9 $^{116}\mathrm{Te}$			76Jo.A
$^{120}\mathrm{Ag}(\beta^-)^{120}\mathrm{Cd}$	8450	100	8330	70	−1.2	3					95Ap.A
$^{120}\mathrm{Cs}^x(\mathrm{IT})^{120}\mathrm{Cs}$	5	4	5	4	.0	1	100	100 $^{120}\mathrm{Cs}$			82Au01 *
$*^{120}\mathrm{Cs}^x(\mathrm{IT})^{120}\mathrm{Cs}$	Original 24(19) corrected for new estimated IT = 100(60)#										GAu **
$^{121}\mathrm{Pr}(\mathrm{p})^{120}\mathrm{Ce}$	837	50				3					90Bo39
$^{121}\mathrm{Cd}(\beta^-)^{121}\mathrm{In}$	4780	80				3			Stu		82Al29 *
$*^{121}\mathrm{Cd}(\beta^-)^{121}\mathrm{In}$	Q^- = 4890(150); and 4960(80) from $^{121}\mathrm{Cd}^m$ at 214.89										NDS **
$^{122}\mathrm{Cs}^m-{}^{133}\mathrm{Cs}_{.917}$	2955	17	2959	10	.2	2			MA4	1.0	95Bo.1
$^{122}\mathrm{Te}(\mathrm{n},\gamma)^{123}\mathrm{Te}$	6929.1	.5	6929.4	0.5	.6	1	98	80 $^{122}\mathrm{Te}$			91Ho08
$^{125}\mathrm{Cs}-{}^{133}\mathrm{Cs}_{.940}$	−1386	14	−1395	8	−.7	–			MA4	1.0	95Bo.1
	ave. −1384	10			−1.1	1	68	66 $^{125}\mathrm{Cs}$			average
$^{125}\mathrm{Cd}(\beta^-)^{125}\mathrm{In}$	7122	62				4			Stu		87Sp09 *
$^{125}\mathrm{Cd}^m(\beta^-)^{125}\mathrm{In}$	7172	35				4			Stu		87Sp09 *
$^{125}\mathrm{I}(\epsilon)^{125}\mathrm{Te}$	185.77	.06				2					94Hi04
$*^{125}\mathrm{Cd}(\beta^-)^{125}\mathrm{In}$	E^- = 4625(62) to 2497.45 level										NDS **
$*^{125}\mathrm{Cd}^m(\beta^-)^{125}\mathrm{In}$	E^- = 5009(109), 4581(126), 4533(39) to 2101.50, 2640.32, 2641.92 levels										NDS **
$^{129}\mathrm{Nd}(\epsilon\mathrm{p})^{128}\mathrm{Ce}$	5300	300	6110#	200#	2.7	D					78Bo.A *
$*^{129}\mathrm{Nd}(\epsilon\mathrm{p})^{128}\mathrm{Ce}$	Systematical trends suggest $^{129}\mathrm{Nd}$ 810 less bound										GAu **
$^{130}\mathrm{Xe}-\mathrm{C}\ {}^{13}\mathrm{C}\ {}^{35}\mathrm{Cl}_3$	−6407.63	1.21	−6405.1	1.0	1.4	1	28	28 $^{130}\mathrm{Xe}$	H47	1.5	94Hy01
$^{130}\mathrm{Sn}(\beta^-)^{130}\mathrm{Sb}$	2195	35	2148	15	−1.3	3			Stu		77Lu06 *
	2080	40			1.7	3					77Nu01
	2149	18			−.1	3			Gsn		90St13 *
$^{130}\mathrm{Sb}^m(\mathrm{IT})^{130}\mathrm{Sb}$	5.1	.2				3					94Wa.A
$^{130}\mathrm{Sb}(\beta^-)^{130}\mathrm{Te}$	5020	100	4959	25	−.6	U			Stu		77Lu06
	4959	25				2			Gsn		90St13 *
$*^{130}\mathrm{Sn}(\beta^-)^{130}\mathrm{Sb}$	E^- = 1490(90), 1150(35) to 702.3, 1047.36 levels										94Wa.A**
*	and Q^- = 3955(50) from $^{130}\mathrm{Sn}^m$ at 1946.88; discrepant, not used										NDS **
$*^{130}\mathrm{Sb}(\beta^-)^{130}\mathrm{Te}$	Q^- = 4990(70); and 4960(25) from $^{130}\mathrm{Sb}^m$ at 5.1										NDS **
$^{131}\mathrm{Xe}-\mathrm{C}_2\ {}^{35}\mathrm{Cl}_2\ {}^{37}\mathrm{Cl}$	1472.65	.80	1473.9	1.0	1.0	1	75	75 $^{131}\mathrm{Xe}$	H47	1.5	94Hy01
$^{131}\mathrm{Nd}(\epsilon\mathrm{p})^{130}\mathrm{Ce}$	4600	400	4270#	400#	−.8	D					78Bo.A *
$^{131}\mathrm{In}(\beta^-)^{131}\mathrm{Sn}$	9165	30	9174	22	.3	5			Stu		95Me.1
$^{131}\mathrm{In}^m(\beta^-)^{131}\mathrm{Sn}$	9480	70	9530	40	.7	5			Stu		95Me.1
$^{131}\mathrm{In}^n(\beta^-)^{131}\mathrm{Sn}$	13230	80	13270	70	.5	5			Stu		95Me.1
$*^{131}\mathrm{Nd}(\epsilon\mathrm{p})^{130}\mathrm{Ce}$	Systematical trends suggest $^{131}\mathrm{Nd}$ 330 more bound										GAu **
$^{132}\mathrm{Xe}-\mathrm{C}\ {}^{13}\mathrm{C}\ {}^{35}\mathrm{Cl}_2\ {}^{37}\mathrm{Cl}$	−2803.73	1.40	−2808.4	1.2	−2.2	1	33	33 $^{132}\mathrm{Xe}$	H47	1.5	94Hy01
$^{132}\mathrm{In}(\beta^-)^{132}\mathrm{Sn}$	14135	60				6			Stu		95Me.1
$^{132}\mathrm{Sn}(\beta^-)^{132}\mathrm{Sb}$	3103	12				5			Stu		90Sp.A
$^{132}\mathrm{Sb}(\beta^-)^{132}\mathrm{Te}$	5486	20				4			Stu		90Sp.A *
$*^{132}\mathrm{Sb}(\beta^-)^{132}\mathrm{Te}$	From the 4^+ ground-state										90Sp.A **
$^{133}\mathrm{Sn}(\beta^-)^{133}\mathrm{Sb}$	7990	25				6			Stu		95Me.1

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
^{134}Xe−C ^{13}C ^{35}Cl ^{37}Cl$_2$		1381.76	.60	1381.8	0.9	.0	1	100	100 ^{134}Xe	H47	1.5	94Hy01	
^{134}Sn(β^-)^{134}Sb		7370	90				5			Stu		95Me.1	
^{134}Sb(β^-)^{134}Te		8390	45	8390	40	.1	4			Stu		95Me.1	
^{134}Te(β^-)^{134}I		1550	30				3			Stu		95Me.1	
^{134}I(β^-)^{134}Xe		4175	15				2			Stu		95Me.1	
^{134}Pr^m(β^+)^{134}Ce		6190	90				4			Dbn		95Gr.A	*
^{134}Pm(β^+)^{134}Nd		9170	200				7			Dbn		95Gr.A	*
*^{134}Pr^m(β^+)^{134}Ce	E^+ = 4120(90) to 1048.83 level											NDS	**
*^{134}Pm(β^+)^{134}Nd	E^+ = 7360(200) to 788.97 4$^+$ level											NDS	**
^{134}Ba(n,γ)^{135}Ba		6972.17	.18	6972.7	0.5	3.0	–			MMn		90Is07	Z
		6971.78	.17			5.5	B			Ltn		93Bo01	*
		6973.24	.22			−2.4	–			BNn		93Ch21	
	ave.	6972.6	0.5			.2	1	99	68 ^{135}Ba			average	
^{135}Pm^m(β^+)^{135}Nd		6040	150				3			Dbn		95Gr.A	*
*^{134}Ba(n,γ)^{135}Ba	B: no data on calibration. Discrepant result!											AHW	**
*^{135}Pm^m(β^+)^{135}Nd	E^+ = 4920(150) to mixture ground-state and 198.5 level											95Gr.A	**
^{136}Ba(n,γ)^{137}Ba		6905.59	.08	6905.739	0.028	1.9	–			Ltn		95Bo03	
	ave.	6905.739	0.028			.0	1	100	68 ^{137}Ba			average	
^{137}Pm^m(β^+)^{137}Nd		5690	130	5660	50	−.3	6			IRS		83Al06	*
		5650	60			.1	6			Dbn		95Gr.A	*
^{137}Sm(β^+)^{137}Pm^m		5900	70				7			Dbn		95Gr.A	
*^{137}Pm^m(β^+)^{137}Nd	E^+ = 4132(+150 − 115) to ^{137}Nd^m at 519.6											NDS	**
*^{137}Pm^m(β^+)^{137}Nd	E^+ = 4110(60) to 11/2$^-$ ^{137}Nd^m at 519.6											NDS	**
^{137}Ba(n,γ)^{138}Ba		8611.5	.15	8611.72	0.04	1.5	U			Ltn		95Bo05	
^{138}Nd(β^+)^{138}Pr		2020	100	1100#	200#	−9.2	D					61Bo.B	*
^{138}Pm(β^+)^{138}Nd		7000	250				4					81De38	*
^{138}Pm^m(β^+)^{138}Nd		7080	60	7080	50	.0	4			Dbn		95Gr.A	
*^{138}Nd(β^+)^{138}Pr	Systematical trends suggest ^{138}Nd 920 more bound											GAu	**
*^{138}Pm(β^+)^{138}Nd	E^+ = 3900(200) to spin 5 and 6 levels at 1990.5, 2134.3 and 2222.0											NDS	**
^{139}Sm−C$_{11.583}$		−77698	16				2			MA5	1.0	95Be.A	
^{139}Pm(β^+)^{139}Nd		4470	50	4504	29	.7	5			Dbn		95Gr.A	
^{139}Sm(β^+)^{139}Pm		5510	150	5160	60	−2.3	U			IRS		83Al06	*
^{139}Eu(β^+)^{139}Sm		6080	50	7020#	150#	18.8	D			Dbn		95Gr.A	*
*^{139}Sm(β^+)^{139}Pm	E^+ = 4735(+180 − 130) from ^{139}Sm^m at 457.8 to ^{139}Pm^m at 188.7											NDS	**
*^{139}Eu(β^+)^{139}Sm	E^+ = 4600(50) to ^{139}Sm^m at 457.8											NDS	**
*^{139}Eu(β^+)^{139}Sm	Systematical trends suggest ^{139}Eu 940 less bound											GAu	**
^{140}Sm−C$_{11.667}$		−81009	16				2			MA5	1.0	95Be.A	
^{140}Cs−^{133}Cs$_{1.053}$		16857	14	16842	9	−1.1	–			MA4	1.0	95Bo.1	
	ave.	16846	10			−.5	1	79	78 ^{140}Cs			average	
^{140}Cs(β^-)^{140}Ba		6199	25	6220	10	.8	–			Ida		93Gr17	
	ave.	6207	16			.8	1	40	21 ^{140}Cs			average	
^{140}Pm(β^+)^{140}Nd		6020	30	6047	23	.9	3			Dbn		95Gr.A	
^{140}Eu(β^+)^{140}Sm		8400	400	8470	50	.2	U			LBL		91Fi03	
		8470	50				3			Dbn		95Gr.A	
^{141}Cs−^{133}Cs$_{1.060}$		20269	16	20270	11	.1	1	46	45 ^{141}Cs	MA4	1.0	95Bo.1	
^{141}Ba−^{133}Cs$_{1.060}$		14631	14	14633	8	.1	–			MA4	1.0	95Bo.1	
	ave.	14628	10			.4	1	66	65 ^{141}Ba			average	
^{141}Nd(β^+)^{141}Pr		1824	3	1823.0	2.8	−.3	–					76Ga.A	*
	ave.	1823.0	2.8			.0	1	100	100 ^{141}Nd			average	
^{141}Sm(β^+)^{141}Pm		4580	50	4529	27	−1.0	–					77Ke03	*
	ave.	4530	30			−.1	1	59	54 ^{141}Pm			average	
^{141}Eu(β^+)^{141}Sm		5950	40	5978	26	.7	2			IRS		83Al06	
		6035	60			−1.0	2					85Af.A	

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
$^{141}\mathrm{Eu}(\beta^+)^{141}\mathrm{Sm}$		5550	100	5978	26	4.3	B			IRS		93Al03	
		5980	40			−.1	2			Dbn		95Gr.A	*
*$^{141}\mathrm{Nd}(\beta^+)^{141}\mathrm{Pr}$	Was erroneously quoted 77Ga.A in the 1993 tables											GAu	**
*$^{141}\mathrm{Sm}(\beta^+)^{141}\mathrm{Pm}$	$E^+ = 3180(50), 3100(50)$ to 403.85, 438.29 levels											NDS	**
*$^{141}\mathrm{Eu}(\beta^+)^{141}\mathrm{Sm}$	$E^+ = 4960(40)$ to 1.58 level											NDS	**
$^{142}\mathrm{Cs}-^{133}\mathrm{Cs}_{1.068}$		25270	16	25275	11	.3	1	47	47 $^{142}\mathrm{Cs}$	MA4	1.0	95Bo.1	
$^{142}\mathrm{Ba}-^{133}\mathrm{Cs}_{1.068}$		17420	14	17431	7	.8	–			MA4	1.0	95Bo.1	
	ave.	17415	10			1.5	1	41	37 $^{142}\mathrm{Ba}$			average	
$^{142}\mathrm{Sm}-\mathrm{C}_{11.833}$		−84816	16	−84807	11	.6	1	52	52 $^{142}\mathrm{Sm}$	MA5	1.0	95Be.A	
$^{142}\mathrm{Eu}(\beta^+)^{142}\mathrm{Sm}$		7673	30	7645	29	−.9	2			Dbn		94Po26	
$^{142}\mathrm{Eu}^m(\beta^+)^{142}\mathrm{Sm}$		8150	60	8160	40	.2	2			Dbn		94Po26	
$^{143}\mathrm{Pm}-\mathrm{C}_{11.917}$		−89079	18	−89072	4	.4	U			MA5	1.0	95Be.A	
$^{143}\mathrm{Sm}-\mathrm{C}_{11.917}$		−85371	17	−85376	4	−.3	U			MA5	1.0	95Be.A	
$^{143}\mathrm{Eu}-\mathrm{C}_{11.917}$		−79703	16	−79713	14	−.6	1	80	80 $^{143}\mathrm{Eu}$	MA5	1.0	95Be.A	
$^{143}\mathrm{Sm}(\beta^+)^{143}\mathrm{Pm}$		3461	40	3443	4	−.5	U			Dbn		94Po26	
$^{143}\mathrm{Eu}(\beta^+)^{143}\mathrm{Sm}$		5236	30	5275	14	1.3	1	21	20 $^{143}\mathrm{Eu}$	Dbn		94Po26	
$^{144}\mathrm{Eu}(\beta^+)^{144}\mathrm{Sm}$		6287	30	6315	17	.9	2			Dbn		94Po26	
$^{145}\mathrm{Tb}^m(\beta^+)^{145}\mathrm{Gd}$		6700	200				3					86Ve.A	*
		6400	150	6700	200	2.0	B			IRS		93Al03	
*$^{145}\mathrm{Tb}^m(\beta^+)^{145}\mathrm{Gd}$	$E^+ = 3300(200)$ to 2382.3 $9/2^-$ level											NDS	**
$^{146}\mathrm{Tm}(p)^{145}\mathrm{Er}$		1126.8	5.				3					93Li18	
$^{146}\mathrm{Tm}^m(p)^{145}\mathrm{Er}$		1197.3	5.				3					93Li18	
$^{146}\mathrm{Tb}(\beta^+)^{146}\mathrm{Gd}$		8310	50	8270	50	−.9	3			Dbn		94Po26	
$^{147}\mathrm{Tm}(p)^{146}\mathrm{Er}$		1058.2	3.3				3					93Se04	
$^{147}\mathrm{Tb}(\beta^+)^{147}\mathrm{Gd}$		4700	90	4609	12	−1.0	U					83Ve06	*
$^{147}\mathrm{Dy}(\beta^+)^{147}\mathrm{Tb}$		6480	100	6370	50	−1.1	2			IRS		85Al08	*
*$^{147}\mathrm{Tb}(\beta^+)^{147}\mathrm{Gd}$	$E^+ = 2460(80)$ to 1152.2 and 1292.3 levels, reinterpreted											AHW	**
*$^{147}\mathrm{Dy}(\beta^+)^{147}\mathrm{Tb}$	$Q^+ = 7180(100)$ from $^{147}\mathrm{Dy}^m$ at 750.5 to $^{147}\mathrm{Tb}^m$ at 50.6(.9)											NDS	**
$^{148}\mathrm{Ce}(\beta^-)^{148}\mathrm{Pr}$		2060	75				3			Bwg		87Gr.A	
$^{148}\mathrm{Pr}(\beta^-)^{148}\mathrm{Nd}$		4800	200	4930	90	.7	2					79Ik06	
		4965	100			−.3	2			Bwg		87Gr.A	
$^{148}\mathrm{Tb}(\beta^+)^{148}\mathrm{Gd}$		5630	80	5760	30	1.7	F					76Cr.B	*
		5835	70			−1.0	2					83Ve06	*
		5752	40			.3	2			GSI		95Ke05	*
$^{148}\mathrm{Dy}(\beta^+)^{148}\mathrm{Tb}$		2682	10				3			GSI		95Ke05	*
*$^{148}\mathrm{Tb}(\beta^+)^{148}\mathrm{Gd}$	$E^+ = 4610(80)$ assumed to ground-state											76Cr.B	**
*	F: since $^{148}\mathrm{Tb}$ gs 2^-, transition to $^{148}\mathrm{Gd}$ gs weak											AHW	**
*$^{148}\mathrm{Tb}(\beta^+)^{148}\mathrm{Gd}$	$E^+ = 2210(70)$ from $^{148}\mathrm{Tb}^m$ at 90.1 to 2693.3 level											NDS	**
*	and $E^+ = 4560(80)$ mainly to 748.5 level. Discrepant, not used											NDS	**
*$^{148}\mathrm{Tb}(\beta^+)^{148}\mathrm{Gd}$	$Q^+ = 5750(40)$; and 5846(50) from $^{148}\mathrm{Tb}^m$ at 90.1											NDS	**
*$^{148}\mathrm{Dy}(\beta^+)^{148}\mathrm{Tb}$	GSI average of $E^+ = 1043(10)$ and 1036(10) of ref.											91Ke11	**
*	to 620.24 level											NDS	**
$^{149}\mathrm{Gd}(\epsilon)^{149}\mathrm{Eu}$		1308	6	1314	4	1.0	1	49	30 $^{149}\mathrm{Eu}$	Got		84Sc.B	
$^{150}\mathrm{Lu}(p)^{149}\mathrm{Yb}$		1269.6	4.	1269.6	2.8	.0	3					93Se04	
$^{151}\mathrm{Ho}(\alpha)^{147}\mathrm{Tb}$		4696.3	4.	4695.1	1.9	−.3	–					79Ho10	*
		4695.8	3.			−.2	–					82Bo04	*
		4693.8	3.			.4	–					82De11	*
	ave.	4695.1	1.9			.0	1	100	100 $^{151}\mathrm{Ho}$			average	

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
^{151}Lu^{m}(p)^{150}Yb		1241.0	2.8				3					93Se04	
^{151}Pr(β^-)^{151}Nd		4082	40	4100	40	.5	3			Ida		93Gr17	
*^{151}Ho(α)^{147}Tb		E = 4523.8(5,Z) to ^{147}Tb^{m} at 50.6(.9); 4610.8(4,Z) from ^{151}Ho^{m} at 41.1(.2)										91To08	**
*^{151}Ho(α)^{147}Tb		E = 4521.5(3,Z) to ^{147}Tb^{m} at 50.6(.9); 4611.5(3,Z) from ^{151}Ho^{m} at 41.1(.2)										91To08	**
*^{151}Ho(α)^{147}Tb		E = 4521.2(3,Z) to ^{147}Tb^{m} at 50.6(.9); 4607.2(4,Z) from ^{151}Ho^{m} at 41.1(.2)										91To08	**
^{152}Gd(n,γ)^{153}Gd		6247.04	.14	6247.08	0.13	.3	–			ILn		93Sp.A	
	ave.	6247.07	0.13			.1	1	100	93 ^{152}Gd			average	
^{153}Nd(β^-)^{153}Pm		3336	25				2			Ida		93Gr17	
^{153}Pm(β^-)^{153}Sm		1863	15	1881	11	1.2	1	52	52 ^{153}Pm	Ida		93Gr17	
^{154}Ho^{m}(α)^{150}Tb^{m}		3819.4	10.	3823	5	.3	3					71To01	Z
		3823.5	5.			−.2	3					74Sc19	Z
^{153}Gd(n,γ)^{154}Gd		8894.54	.20	8894.77	0.17	1.2	–			ILn		93Sp.A	
	ave.	8894.76	0.17			.1	1	100	91 ^{153}Gd			average	
^{154}Nd(β^-)^{154}Pm^{m}		2687	25				3			Ida		93Gr17	
^{154}Pm^{m}(IT)^{154}Pm		−30	20	50	130	3.9	B					90So08	
^{154}Pm(β^-)^{154}Sm		3900	200	4040	70	.7	2					71Da28	
		4056	100			−.1	2			Ida		93Gr17	
^{154}Pm^{m}(β^-)^{154}Sm		3910	200	4090	110	.9	2					74Ya07	
^{154}Tm^{m}(β^+)^{154}Er		8232	150	8250	50	.1	U			Dbn		94Po26	
^{155}Tm(α)^{151}Ho		4579.3	10.	4571	5	−.7	–					71To01	*
	ave.	4572	5			−.1	1	100	99 ^{155}Tm			average	
^{155}Lu(α)^{151}Tm^{m}		5723.0	10.	5726	5	.3	14					89Ho12	
		5727.0	5.			−.2	14					91To08	
^{155}Lu^{m}(α)^{151}Tm		5796.9	5.	5797	4	.1	16					89Ho12	
		5797.9	5.			−.1	16					91To08	
^{155}Nd(β^-)^{155}Pm		4222	150				4			Ida		93Gr17	
^{155}Pm(β^-)^{155}Sm		3224	30				3			Ida		93Gr17	
^{155}Sm(β^-)^{155}Eu		1607	25	1626.9	1.2	.8	U			Ida		93Gr17	
*^{155}Tm(α)^{151}Ho		First assigned to ^{156}Tm^{m} but belongs to ^{155}Tm gs										94To10	**
^{156}Er(α)^{152}Dy		3109.9	70.	3440	70	4.7	B					95Ka.A	*
^{156}Ta^{m}(p)^{155}Hf		1110.2	12.				3					93Li34	
^{156}Er(β^+)^{156}Ho		1670	70	1220#	210#	−6.5	B					82Vy06	
^{156}Tm(β^+)^{156}Er		7458	50	7440	40	−.3	5			Dbn		94Po26	
		7390	100			.5	5					95Ga.A	
*^{156}Er(α)^{152}Dy		B: disagrees badly with other data and with systematics 3600#200										AHW	**
^{157}Sm(β^-)^{157}Eu		2734	50				2			Ida		93Gr17	
^{157}Er(β^+)^{157}Ho		3547	100	3500	60	−.5	3			Dbn		94Po26	
^{157}Tm(β^+)^{157}Er		4482	100	4480	70	.0	4			Dbn		94Po26	
^{157}Yb(β^+)^{157}Tm		5074	100	5500	120	4.2	B			Dbn		94Po26	
^{158}Sm(β^-)^{158}Eu		1999	15				3			Ida		93Gr17	
^{158}Er(β^+)^{158}Ho		1710	40	900#	100#	−20.3	F					82Vy06	*
^{158}Tm(β^+)^{158}Er		6624	60	6600	50	−.4	4			Dbn		94Po26	
^{158}Lu(ϵ)^{158}Yb		8960	200	8670#	120#	−1.4	B					95Ga.A	
*^{158}Er(β^+)^{158}Ho		F: $Q < 1550$ from upper limit on p+										75Bu.A	**
^{159}Ta(α)^{155}Lu		5660	50	5660	50	.1	13					95Da.A	
		5660	50			.0	13					95Pa.A	
^{159}Ta^{m}(α)^{155}Lu^{m}		5745.8	6.	5745	4	−.2	17					79Ho10	
		5739.7	15.			.3	17					95Da.A	
		5744.7	5.			.0	17					95Pa.A	
^{159}Tm(β^+)^{159}Er		3670	100	3850	70	1.8	–			Dbn		94Po26	
	ave.	3760	70			1.2	1	85	85 ^{159}Tm			average	

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
^{159}Yb(β^+)^{159}Tm		4554	150	4980	90	2.8	–			Dbn		94Po26	
	ave.	4730	120			2.1	1	57	42 ^{159}Yb			average	
^{159}Lu(β^+)^{159}Yb		5803	150	6020	90	1.4	–			Dbn		94Po26	
	ave.	5830	110			1.8	1	66	58 ^{159}Yb			average	
^{160}Ta(α)^{156}Lu		5450	50				4					95Pa.A	
^{160}Ta^m(α)^{156}Lu^m		5550	50	5550	50	–.1	5					79Ho10	Z
		5540	50			.2	5					92Ha10	
		5550	50			.0	5					95Pa.A	
^{160}Tm(β^+)^{160}Er		5600	300				3					75St12	
^{161}Yb(β^+)^{161}Tm		3585	200	4150#	200#	2.8	D			Dbn		94Po26	*
^{161}Lu(β^+)^{161}Yb		4888	150	5300	100	2.7	B			Dbn		94Po26	
*^{161}Yb(β^+)^{161}Tm		Systematical trends suggest ^{161}Yb 460 less bound										GAu	**
^{162}Tm(β^+)^{162}Er		4892	50	4840	30	–1.1	2			Dbn		94Po26	
^{162}Lu(β^+)^{162}Yb		6740	270	6960	80	.8	3					83Ge08	
		6960	100			.0	3			IRS		93Al03	
		7028	150			–.5	3			Dbn		94Po26	
^{163}Re(α)^{159}Ta		6010	50				12					95Da.A	
^{163}Re^m(α)^{159}Ta^m		6067.2	6.	6069	6	.3	18					79Ho10	
		6079.5	15.			–.7	18					95Da.A	
^{163}Ho(ϵ)^{163}Dy		2.56	.05	2.565	0.014	.1	–					85Ha12	*
		2.54	.03			.8	–					93Bo.A	*
		2.71	.10			–1.5	U					94Ya07	
	ave.	2.565	0.014			.0	1	100	98 ^{163}Ho			average	
*^{163}Ho(ϵ)^{163}Dy		Orig. value 2.60(.03) corrected to 2.561(.020) for dynamic effects										87Sp02	**
*		error 0.020 is statistical only										87Sp02	**
*^{163}Ho(ϵ)^{163}Dy		Original 2616 < Q < 2694 68% CL from ^{163}Dy$_{66}$+(β^-)^{163}Ho$_{66}$+										92Ju01	**
*		corrected to 2511 < Q < 2572 68% CL										93Bo.A	**
^{164}Tm(β^+)^{164}Er		3966	50	3963	19	–.1	2			Dbn		94Po26	
^{164}Lu(β^+)^{164}Yb		6213	120	6240	70	.2	3			Dbn		94Po26	
^{167}Re^m(α)^{163}Ta		5410	50	5410	50	.0	3					82De11	*
		5400	50			.2	3					84Sc06	*
^{167}Ir(α)^{163}Re		6490	50				11					95Da.A	
^{167}Ir^m(α)^{163}Re^m		6543.0	10.	6547	7	.4	19					81Ho10	
		6551.1	10.			–.4	19					95Da.A	
^{167}Ir(p)^{166}Os		1110	10				10					95Da.A	
*^{167}Re^m(α)^{163}Ta		Original assignment to ^{168}Re changed by ref.										92Mc10	**
*^{167}Re^m(α)^{163}Ta		Original assignment to ^{168}Re^m changed by ref.										92Mc10	**
*		original $E(\alpha)$ = 5250 recalibrated using their ^{168}Os–^{170}Os results										GAu	**
^{168}Os(α)^{164}W		5812.7	8.	5818.0	2.9	.7	8					95Hi02	
^{168}Ir(α)^{164}Re^p		6410	50				7					82De11	
^{169}Os(α)^{165}W		5717.6	4.	5717	4	–.2	7					82De11	
		5713	8			.4	7					95Hi02	
^{170}Os(α)^{166}W		5533.4	8.	5539	3	.7	8					95Hi02	
^{170}Ho^m(β^-)^{170}Er		3970	60				2					78Tu04	
^{171}Os(α)^{167}W		5365.8	10.	5370	5	.4	6					72To06	
		5365.8	10.			.4	6					78Sc26	
		5393.4	15.			–1.5	6					79Ha10	
		5367.9	8.			.2	6					95Hi02	
^{171}Au^m(α)^{167}Ir^m		7180	50				20					95Da.A	

Item	Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
^{172}Au(α)^{168}Ir	7020	50				8					93Se09	
^{172}W(β^+)^{172}Ta	3250	100	2500#	200#	−7.5	D					74Ca.A	*
*^{172}W(β^+)^{172}Ta	Systematical trends suggest ^{172}W 750 more bound										GAu	**
^{175}Ir(α)^{171}Re	5709.0	5.	5709	4	.0	4					67Si02	*
	5709.2	5.			.0	4					92Sc16	*
^{175}Pt(α)^{171}Os	6178.1	3.	6178.3	2.6	.1	5					82De11	*
^{175}Au^m(α)^{171}Ir	6780.9	10.	6778	7	−.3	6					75Ca06	
	6775.8	10.			.3	6					84Sc.A	
*^{175}Ir(α)^{171}Re	$E(\alpha)$ = 5392.8(5,Z) to 189.8 level										95Hi02	**
*^{175}Ir(α)^{171}Re	$E(\alpha)$ = 5393(5) to 189.8 level										95Hi02	**
*^{175}Pt(α)^{171}Os	$E(\alpha)$ = 5959.2(3,Z) to 76.4(.5) level										84Sc.A	**
^{176}Tm(β^-)^{176}Yb	4120	100				2					67Gu11	*
*^{176}Tm(β^-)^{176}Yb	E^- = 2000(100), 1150(100) to 2053.4, 3050 levels										NDS	**
^{177}Au(α)^{173}Ir	6435.9	10.	6431	7	−.5	5					84Sc.A	
^{178}Pt(α)^{174}Os	5568.4	13.	5573.4	2.6	.4	U					94Wa23	
^{179}Pt(α)^{175}Os	5371	20	5395	7	1.2	5					66Si08	*
	5415	10			−2.0	5					79Ha10	*
	5382	10			1.3	5					82Bo04	*
*^{179}Pt(α)^{175}Os	$E(\alpha)$ = 5150(10) to 102.3 level										NDS	**
*	error increased: part of double line (with ^{180}Pt)										AHW	**
*^{179}Pt(α)^{175}Os	$E(\alpha)$ = 5194(10) to 102.3 level										NDS	**
*^{179}Pt(α)^{175}Os	$E(\alpha)$ = 5161(3) to 102.3 level, recalibrated as in ref.										91Ry01	**
*	error increased: part of double line (with ^{180}Pt)										AHW	**
^{180}Pt(α)^{176}Os	5257.1	20.	5275	9	.9	8					66Si08	*
	5279	10			−.4	8					82Bo04	*
^{180}Au(α)^{176}Ir	5845	30	5851	21	.2	4					86Ke03	*
	5857	30			−.2	4			Lvn		93Wa03	*
^{180}Hg(α)^{176}Pt	6258.4	5.	6258	4	.0	3			Lvn		93Wa03	Z
^{179}Hf(n,γ)^{180}Hf	7387.7	.3	7387.90	0.24	.7	–					90Bo52	
ave.	7387.81	0.24			.4	1	98	79 ^{180}Hf			average	
*^{180}Pt(α)^{176}Os	$E(\alpha)$ = 5140(10) but error increased: part of double line (with ^{179}Pt)										AHW	**
*^{180}Pt(α)^{176}Os	$E(\alpha)$ = 5161(3) recalibrated as in ref.										91Ry01	**
*	error increased: part of double line (with ^{179}Pt)										AHW	**
*^{180}Au(α)^{176}Ir	$E(\alpha)$ = 5685(10) to 40(30) level										93Wa03	**
*^{180}Au(α)^{176}Ir	$E(\alpha)$ = 5647(10,Z) to 80(30) level										93Wa03	**
^{181}Pt(α)^{177}Os	5150	50				6					95Bi01	
^{181}Tl(α)^{177}Au	6320	50	6600#	300#	5.6	F					92Bo.D	*
^{181}Pb(α)^{177}Hg	7370	50	7240#	120#	−2.7	F					86Ke03	*
^{181}Pb^m(α)^{177}Hg^p	7224.9	20.	7211	12	−.7	11					95To.A	
^{181}Os(β^+)^{181}Re	2990	200				3					67Go25	*
*^{181}Tl(α)^{177}Au	Probably to excited levels in ^{177}Au										92Bo.D	**
*^{181}Pb(α)^{177}Hg	F: α-line not found by ref. in same reaction										95To.A	**
*^{181}Os(β^+)^{181}Re	E^+ = 1750(200) from ^{181}Os^m at 48.9(.2) to 263.0 level										95Ro09	**
^{182}Pt(α)^{178}Os	4952.0	5.				2					95Bi01	
^{182}Au(α)^{178}Ir	5526.2	5.	5527	4	.1	3					95Bi01	*
^{182}Hg(α)^{178}Pt	5990.2	13.	5997	5	.5	4					94Wa23	
*^{182}Au(α)^{178}Ir	$E(\alpha)$ = 5403(5), 5352(5) to ground-state and 55(1) level										NDS	**

Item	Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference
$^{183}\mathrm{Pt}(\alpha)^{179}\mathrm{Os}$	4820	50				6					95Bi01
$^{183}\mathrm{Au}(\alpha)^{179}\mathrm{Ir}$	5462.6	5.	5465.6	3.0	.6	6					68Si01 Z
	5465.7	5.			.0	6					82Bo04 Z
	5449.3	10.			1.6	C					84Br.A
$^{184}\mathrm{Pt}(\alpha)^{180}\mathrm{Os}$	4602.2	10.	4602	9	.0	5					95Bi01
$^{184}\mathrm{Au}(\alpha)^{180}\mathrm{Ir}$	5218.6	15.	5232	5	.9	6					70Ha18 *
	5233.9	5.			−.3	6					95Bi01 *
$^{184}\mathrm{Au}(\beta^+)^{184}\mathrm{Pt}$	6450	50	7060#	60#	12.2	D					84Da.A *
$^{184}\mathrm{Hg}(\beta^+)^{184}\mathrm{Au}$	3660	30	4120#	60#	15.3	D					84Da.A *
$*^{184}\mathrm{Au}(\alpha)^{180}\mathrm{Ir}$	$E(\alpha)$ = 5172(15) from $^{184}\mathrm{Au}^m$ at 68.6(.1)										94Ib01 **
*	transition to ground-state in $^{180}\mathrm{Ir}$										95Bi01 **
$*^{184}\mathrm{Au}(\alpha)^{180}\mathrm{Ir}$	$E(\alpha)$ = 5187(5) from $^{184}\mathrm{Au}^m$ at 68.6(.1)										94Ib01 **
$*^{184}\mathrm{Au}(\beta^+)^{184}\mathrm{Pt}$	Systematical trends suggest $^{184}\mathrm{Au}$ 610 less bound										GAu **
$*^{184}\mathrm{Hg}(\beta^+)^{184}\mathrm{Au}$	Systematical trends suggest $^{184}\mathrm{Hg}$ 460 less bound										GAu **
$^{185}\mathrm{Au}(\alpha)^{181}\mathrm{Ir}$	5180.2	5.	5181	4	.1	6					68Si01 *
	5182.9	5.			−.1	6					70Ha18 *
	5181.2	10.			−.1	6					91Bi04 *
$^{185}\mathrm{Bi}^p(\mathrm{p})^{184}\mathrm{Pb}$	1669	50				5					95Da.A
$*^{185}\mathrm{Au}(\alpha)^{181}\mathrm{Ir}$	Ground-state to ground-state transition (,Z)										95Bi01 **
$*^{185}\mathrm{Au}(\alpha)^{181}\mathrm{Ir}$	Ground-state to ground-state transition or very low level; from coinc.										95Bi01 **
$^{186}\mathrm{Au}(\alpha)^{182}\mathrm{Ir}$	4907	15	4906	15	−.1	1	99	50 $^{186}\mathrm{Au}$			90Ak04 *
$*^{186}\mathrm{Au}(\alpha)^{182}\mathrm{Ir}$	$E(\alpha)$ = 4653(15) to 152.3 level										95Ho.3 **
$^{187}\mathrm{Hg}^m(\alpha)^{183}\mathrm{Pt}$	5179.8	20.				5					70Ha18 *
$^{187}\mathrm{Re}(\beta^-)^{187}\mathrm{Os}$	2.70	.09	2.663	0.019	−.4	U					93As02
$^{187}\mathrm{Au}(\beta^+)^{187}\mathrm{Pt}$	3600	40	3730#	100#	3.3	D					83Gn01 *
$*^{187}\mathrm{Hg}^m(\alpha)^{183}\mathrm{Pt}$	$E(\alpha)$ = 5035(20) to $^{183}\mathrm{Pt}^m$ at 34.50										NDS **
$*^{187}\mathrm{Au}(\beta^+)^{187}\mathrm{Pt}$	Systematical trends suggest $^{187}\mathrm{Pt}$ 130 more bound										GAu **
$^{188}\mathrm{Pb}(\alpha)^{184}\mathrm{Hg}$	6109.3	10.	6111	4	.2	7			Lvn		93Wa03 Z
$^{188}\mathrm{Au}(\beta^+)^{188}\mathrm{Pt}$	5520	30	5300#	100#	−7.3	D					84Da.A *
$^{188}\mathrm{Hg}(\beta^+)^{188}\mathrm{Au}$	2040	20	2300#	150#	13.0	D					84Da.A *
$*^{188}\mathrm{Au}(\beta^+)^{188}\mathrm{Pt}$	Systematical trends suggest $^{188}\mathrm{Au}$ 220 more bound										GAu **
$*^{188}\mathrm{Hg}(\beta^+)^{188}\mathrm{Au}$	Systematical trends suggest $^{188}\mathrm{Hg}$ 260 less bound										GAu **
$^{189}\mathrm{Pb}^m(\alpha)^{185}\mathrm{Hg}$	5958.0	10.	5953	7	−.5	4					72Ga27 *
	5947.7	10.			.5	4					74Le02 *
$^{189}\mathrm{Bi}(\alpha)^{185}\mathrm{Tl}$	7266.9	10.	7267	4	.1	3					84Sc.A *
$^{189}\mathrm{Bi}^m(\alpha)^{185}\mathrm{Tl}$	7360	50	7484	25	2.4	C					84Sc.A
	7499.0	30.			−.5	3					93An19
	7458.2	40.			.6	3					95Ba.B
$*^{189}\mathrm{Pb}^m(\alpha)^{185}\mathrm{Hg}$	$E(\alpha)$ = 5730.1(10,Z) to $^{185}\mathrm{Hg}^m$ at 103.8(1.0)										87Ki.A **
$*^{189}\mathrm{Pb}^m(\alpha)^{185}\mathrm{Hg}$	$E(\alpha)$ = 5720(10) to $^{185}\mathrm{Hg}^m$ at 103.8(1.0)										87Ki.A **
$*^{189}\mathrm{Bi}(\alpha)^{185}\mathrm{Tl}$	$E(\alpha)$ = 6675(10,Z) to $^{185}\mathrm{Tl}^m$ at 452.8(2.0)										77Sc03 **
$^{190}\mathrm{Re}^m(\mathrm{IT})^{190}\mathrm{Re}$	210	50				3					AHW *
	210	290	210	50	.0	U					AHW *
$^{190}\mathrm{Hg}(\beta^+)^{190}\mathrm{Au}$	2105	80	1470#	150#	−7.9	D					74Di.A *
$*^{190}\mathrm{Re}^m(\mathrm{IT})^{190}\mathrm{Re}$	From lower limit 119.12 and upper limit 300 from calculated 173 and 220										NDS **
$*^{190}\mathrm{Re}^m(\mathrm{IT})^{190}\mathrm{Re}$	From difference in β-decay										AHW **
$*^{190}\mathrm{Hg}(\beta^+)^{190}\mathrm{Au}$	Systematical trends suggest $^{190}\mathrm{Hg}$ 635 more bound										GAu **
$^{192}\mathrm{Tl}^p(\mathrm{IT})^{192}\mathrm{Tl}$	200	50				4			Lvn		91Va04

Item	Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
^{193}At(α)^{189}Bi	7526.3	30.				4					95Le.A	*
*^{193}At(α)^{189}Bi	Possibly mixture with ^{193}At^{m}										95Le.A	**
^{194}At^{m}(α)^{190}Bi^{m}	7362.1	20.	7357	14	−.3	6					95Le.A	
^{194}Ir^{n}(β^-)^{194}Pt	2600	70				2					68Su02	
^{195}Po(α)^{191}Pb	6760	50	6750	50	−.3	U					67Si09	Z
^{195}At(α)^{191}Bi	7340	50	7360	50	.3	4					83Le.A	
	7370	50			−.3	4					95Le.A	
	7280	50			1.5	U					95No.A	*
^{195}At^{m}(α)^{191}Bi^{m}	7095.8	30.				4					95Le.A	
*^{195}At(α)^{191}Bi	Preliminary										95No.A	**
^{196}Po(α)^{192}Pb	6653.1	18.	6657	3	.2	U					95Le04	
^{196}At(α)^{192}Bi	7190	50	7200	50	.3	4					95Le15	
^{196}Rn(α)^{192}Po	7623	30				9					95No.A	*
^{196}Ir^{m}(β^-)^{196}Pt	3628	100				2					68Ja06	
*^{196}Rn(α)^{192}Po	Preliminary										95No.A	**
^{197}Rn(α)^{193}Po	7410	50	7410	50	.0	4					95Le.A	
	7410	50			.0	4					95No.A	
^{197}Rn^{m}(α)^{193}Po^{m}	7508.7	7.	7510	7	.2	5					95Le.A	
	7523	20			−.6	5					95No.A	
^{198}Rn(α)^{194}Po	7353.8	5.	7352	5	−.4	4			Lvn		95Bi.B	
^{197}Au(n,γ)^{198}Au	6512.35	.11	6512.34	0.11	−.1	1	100	51 ^{198}Au	ILn		79Br26	*
*^{197}Au(n,γ)^{198}Au	Recalibrated ,Z										93Eg.A	**
^{198}Pt(^{18}O,^{17}F)^{199}Ir	−8240	41				3					95Zh10	
^{200}At^{m}(α)^{196}Bi^{m}	6542.8	5.	6542.4	1.4	−.1	7					67Tr06	Z
	6542.9	2.			−.2	7					75Ba.B	Z
^{200}Rn(α)^{196}Po	7042.1	12.	7043.5	2.6	.1	U					95Le04	
^{200}Fr(α)^{196}At	7620	50	7630	50	.2	5					95Le.A	
	7650	50			−.4	5					95No.A	
^{201}Rn(α)^{197}Po	6860	50	6860	50	−.1	4					95Le04	
^{201}Rn^{m}(α)^{197}Po^{m}	6915.9	7.	6909.8	2.2	−.8	5					95Le04	
^{202}At(α)^{198}Bi	6355.8	3.	6353.7	1.4	−.7	4					63Ho18	Z
^{202}At^{m}(α)^{198}Bi^{m}	6259.9	2.	6258.9	1.2	−.5	5					63Ho18	Z
	6256.8	3.			.7	5					67Tr06	Z
	6257.2	5.			.3	5					74Ho27	Z
	6259.0	2.			.0	5					75Ba.B	*
^{202}Rn(α)^{198}Po	6773.4	7.	6773.6	1.9	.0	6					95Le04	
^{202}Hg(d,^{3}He)^{201}Au−^{206}Pb()^{205}Tl	−979.9	3.1	−980	3	.0	1	100	100 ^{201}Au			94Gr07	
*^{202}At^{m}(α)^{198}Bi^{m}	Assignment to ^{202}At^{m} by ref.		Recalibrated ,Z								92Hu04	**
^{203}At(α)^{199}Bi	6211.6	3.	6210.3	0.8	−.4	2					75Ba.B	
^{203}Rn(α)^{199}Po	6630	10	6629.8	2.3	.0	U					95Uu.1	
^{203}Rn^{m}(α)^{199}Po^{m}	6683.9	7.	6680.6	1.9	−.5	9					95Le04	
^{203}Ra(α)^{199}Rn	7730	50				5					95Le.A	
^{203}Ra^{m}(α)^{199}Rn^{m}	7768.4	20.				6					95Le.A	
^{203}Au(β^-)^{203}Hg	2040	60	2124	4	1.4	U					94We02	

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
$^{204}\mathrm{At}(\alpha)^{200}\mathrm{Bi}$		6070.2	3.	6069.9	1.5	−.1	3					63Ho18	Z
		6066.1	3.			1.2	3					67Tr06	Z
		6071.2	3.			−.4	3					75Ba.B	
		6072.2	3.			−.8	3					81Va27	Z
$^{204}\mathrm{Rn}(\alpha)^{200}\mathrm{Po}$		6537.4	7.	6545.6	1.9	1.2	4					95Le04	
$^{204}\mathrm{Fr}(\alpha)^{200}\mathrm{At}$		7167.8	7.	7169.8	2.7	.3	7					95Le04	
$^{204}\mathrm{Fr}^{m}(\alpha)^{200}\mathrm{At}^{m}$		7108.6	5.	7111	4	.4	7			Lvn		92Hu04	
		7114.7	7.			−.6	7					95Le04	
$^{204}\mathrm{Fr}^{n}(\alpha)^{200}\mathrm{At}^{n}$		7160.6	7.	7156	4	−.7	8					94Le05	
$^{204}\mathrm{Ra}(\alpha)^{200}\mathrm{Rn}$		7638.1	12.	7636	8	−.2	7					95Le04	
		7634.0	15.			.2	7					95Le.A	
$^{204}\mathrm{Hg}(\mathrm{d},{}^{3}\mathrm{He})^{203}\mathrm{Au}-{}^{206}\mathrm{Pb}()^{205}\mathrm{Tl}$		−1582.0	3.0	−1582.0	3.0	.0	1	100	100 $^{203}\mathrm{Au}$			94Gr07	
$^{204}\mathrm{Au}(\beta^{-})^{204}\mathrm{Hg}$		4500	300	3940#	200#	−1.9	F					67Wa23	*
*$^{204}\mathrm{Au}(\beta^{-})^{204}\mathrm{Hg}$	F: reported 4 s activity does not exist											NDS	**
$^{205}\mathrm{Tl}\,{}^{35}\mathrm{Cl}-{}^{203}\mathrm{Tl}\,{}^{37}\mathrm{Cl}$		5032.88	1.01	5033.3	0.6	.3	–			H42	1.5	93Si05	
	ave.	5032.5	1.3			.6	1	19	11 $^{205}\mathrm{Tl}$			average	
$^{205}\mathrm{Fr}(\alpha)^{201}\mathrm{At}$		7050	50	7050	50	.0	2					95Le04	
$^{205}\mathrm{Ra}(\alpha)^{201}\mathrm{Rn}$		7500	50				5					95Le15	
$^{205}\mathrm{Ra}^{m}(\alpha)^{201}\mathrm{Rn}^{m}$		7501.7	10.	7504	9	.3	6					95Le04	
		7522.1	25.			−.7	6					95Le15	
$^{206}\mathrm{Pb}\,{}^{35}\mathrm{Cl}-{}^{204}\mathrm{Pb}\,{}^{37}\mathrm{Cl}$		4371.29	.81	4370.3	0.5	−.8	–			H42	1.5	93Si05	
	ave.	4371.2	1.1			−.8	1	17	15 $^{204}\mathrm{Pb}$			average	
$^{206}\mathrm{Ra}(\alpha)^{202}\mathrm{Rn}$		7406	15	7416	5	.7	U					95Uu.1	
$^{207}\mathrm{Pb}\,{}^{35}\mathrm{Cl}-{}^{205}\mathrm{Tl}\,{}^{37}\mathrm{Cl}$		4417.32	1.40	4418.4	0.6	.5	1	9	8 $^{205}\mathrm{Tl}$	H42	1.5	93Si05	
$^{207}\mathrm{Ra}(\alpha)^{203}\mathrm{Rn}$		7280	50	7270	50	−.1	9					95Uu.1	
$^{207}\mathrm{Ra}^{m}(\alpha)^{203}\mathrm{Rn}^{m}$		7463.5	10.	7468	8	.3	10					87He10	
		7473.1	15.			−.5	10					95Le15	
$^{207}\mathrm{Ac}(\alpha)^{203}\mathrm{Fr}$		7860	50				8					94Le05	
$^{208}\mathrm{Pb}\,{}^{35}\mathrm{Cl}-{}^{206}\mathrm{Pb}\,{}^{37}\mathrm{Cl}$		5136.93	.41	5136.96	0.16	.0	1	7	4 $^{206}\mathrm{Pb}$	H42	1.5	93Si05	
$^{208}\mathrm{Ac}(\alpha)^{204}\mathrm{Fr}$		7720.8	15.				8					94Le05	
$^{208}\mathrm{Ac}^{m}(\alpha)^{204}\mathrm{Fr}^{n}$		7892.1	20.	7901	14	.5	9			Dba		94An01	
		7910.4	20.			−.5	9					94Le05	
$^{209}\mathrm{Ac}(\alpha)^{205}\mathrm{Fr}$		7740	50	7730	50	−.1	2			Dba		94An01	
		7730	50			.1	2					94Le05	
$^{210}\mathrm{Th}(\alpha)^{206}\mathrm{Ra}$		8052.7	17.				8					95Uu.1	
$^{211}\mathrm{Th}(\alpha)^{207}\mathrm{Ra}$		7940	50				10					95Uu.1	
$^{207}\mathrm{Fr}-{}^{213}\mathrm{Fr}_{.324}\,{}^{204}\mathrm{Fr}_{.676}$		−2540	330	−2140#	240#	.5	D			P24	2.5	82Au01	*
$^{213}\mathrm{Ra}(\alpha)^{209}\mathrm{Rn}$		6862.4	5.	6861	4	−.2	3					76Ra37	*
$^{213}\mathrm{Ra}^{m}(\alpha)^{209}\mathrm{Rn}$		8629.4	5.				3					76Ra37	
$^{213}\mathrm{Pa}(\alpha)^{209}\mathrm{Ac}$		8390	50				3					95Ni05	
*$^{207}\mathrm{Fr}-{}^{213}\mathrm{Fr}_{.324}\,{}^{204}\mathrm{Fr}_{.676}$	DM = −2470(330) for $^{204}\mathrm{Fr}^{x}$ at estimated E_{exc} = 100(70)											AHW	**
*$^{207}\mathrm{Fr}-{}^{213}\mathrm{Fr}_{.324}\,{}^{204}\mathrm{Fr}_{.676}$	Systematical trends suggest $^{204}\mathrm{Fr}$ 590 more bound											GAu	**
*$^{213}\mathrm{Ra}(\alpha)^{209}\mathrm{Rn}$	$E(\alpha)$ = 6731.9, 6624.9, 6523.9(5,Z) to gs, 110.1, 214.7 levels											NDS	**
$^{214}\mathrm{Bi}(\alpha)^{210}\mathrm{Tl}$		5616.2	1.0	5616.8	0.9	.6	2					34Le01	*
$^{214}\mathrm{Pa}(\alpha)^{210}\mathrm{Ac}$		8270	50				4					95Ni05	
*$^{214}\mathrm{Bi}(\alpha)^{210}\mathrm{Tl}$	$E(\alpha)$=5510.5, 5449.8(1.0,Z) to ground-state, 62.5 level											NDS	**

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
$^{215}\mathrm{Pa}(\alpha)^{211}\mathrm{Ac}$		8240	50	8240	50	.0	3					79Sc09	*
		8240	50			.0	3			GSa		95Ho.C	
$*^{215}\mathrm{Pa}(\alpha)^{211}\mathrm{Ac}$		$Q(\alpha)$ = 8167.2(15) in 1993 table was a typo error										GAu	**
$^{216}\mathrm{Th}^{p}(\alpha)^{212}\mathrm{Ra}$		10107.4	40.	10101	18	−.2	6					93An07	
$^{216}\mathrm{Pa}(\alpha)^{212}\mathrm{Ac}$		8100	50				3			GSa		95Ho.C	
$^{217}\mathrm{Pa}(\alpha)^{213}\mathrm{Ac}$		8490	50	8490	50	.0	3			GSa		95Ho.C	
$^{217}\mathrm{Pa}^{m}(\alpha)^{213}\mathrm{Ac}$		10350	50	10350	50	−.1	3					79Sc09	
		10350	50			.0	3			GSa		95Ho.C	
$^{218}\mathrm{Rn}(\alpha)^{214}\mathrm{Po}$		7265.0	5.	7263.0	1.9	−.4	–					56As38	Z
	ave.	7262.8	1.9			.1	1	96	89 $^{218}\mathrm{Rn}$			average	
$^{218}\mathrm{Pa}(\alpha)^{214}\mathrm{Ac}$		9790	50	9790	50	.0	3			GSa		95Ho.C	
$^{219}\mathrm{Ra}(\alpha)^{215}\mathrm{Rn}$		8138.0	3.				4					94Sh02	
$^{219}\mathrm{U}(\alpha)^{215}\mathrm{Th}$		9860	50				4					93An07	
$^{221}\mathrm{Ac}(\alpha)^{217}\mathrm{Fr}$		7790	50	7780	50	−.2	4					92An.A	
$^{222}\mathrm{Ac}(\alpha)^{218}\mathrm{Fr}$		7137.5	2.				4					82Bo04	Z
$^{222}\mathrm{Ac}^{m}(\alpha)^{218}\mathrm{Fr}^{p}$		7140.3	20.				5					72Es03	
$^{222}\mathrm{Pa}(\alpha)^{218}\mathrm{Ac}^{p}$		8696.7	15.	8697	13	.0	7			GSa		95Ho.C	
$^{223}\mathrm{Pa}(\alpha)^{219}\mathrm{Ac}$		8340	50	8340	50	.0	5			GSa		95Ho.C	
$^{224}\mathrm{Pa}(\alpha)^{220}\mathrm{Ac}$		7681	15	7694	4	.8	6			GSa		95Ho.C	
$^{133}\mathrm{Cs}-^{226}\mathrm{Ra}_{.588}$		−109500	13	−109490	3	.8	–			MA4	1.0	95Bo.1	
	ave.	−109491	7			.2	1	21	17 $^{133}\mathrm{Cs}$			average	
$^{226}\mathrm{Th}(\alpha)^{222}\mathrm{Ra}$		6448.5	3.0	6451.2	1.0	.9	–					56As38	*
	ave.	6451.1	1.0			.1	1	99	58 $^{226}\mathrm{Th}$			average	
$^{226}\mathrm{U}(\alpha)^{222}\mathrm{Th}$		7747.4	30.	7715	14	−1.1	5					73Vi10	*
$*^{226}\mathrm{Th}(\alpha)^{222}\mathrm{Ra}$		$E(\alpha)$ = 6334.6(3,Z), 6224.6(3,Z) to ground-state, 111.12 level										NDS	**
$*^{226}\mathrm{U}(\alpha)^{222}\mathrm{Th}$		$E(\alpha)$ = 7430(30) to 2^+ level at 183.3(.3)										94Ye08	**
$^{228}\mathrm{Pa}(\alpha)^{224}\mathrm{Ac}$		6266.7	3.	6264.5	1.5	−.7	3					58Hi.A	*
		6264.7	3.			−.1	3					93Sh07	*
		6263.5	2.			.5	3					94Ah03	*
$^{228}\mathrm{Pu}(\alpha)^{224}\mathrm{U}$		7949.7	20.				7			Dbb		94An02	
$*^{228}\mathrm{Pa}(\alpha)^{224}\mathrm{Ac}$		$E(\alpha)$ = 6119.2(3,Z), 6106.2(3,Z), 6079.2(3,Z) to 37.2, 51.9, 78.4 levels										93Sh07	**
$*^{228}\mathrm{Pa}(\alpha)^{224}\mathrm{Ac}$		$E(\alpha)$ = 6118(3) to 37.2 level										93Sh07	**
$*^{228}\mathrm{Pa}(\alpha)^{224}\mathrm{Ac}$		$E(\alpha)$ = 6117(2) to 37.1 level										94Ah03	**
$^{229}\mathrm{Pa}(\alpha)^{225}\mathrm{Ac}$		5835.6	5.				2					63Su.A	*
$^{229}\mathrm{Pu}(\alpha)^{225}\mathrm{U}$		7590	50				7			Dbb		94An02	
$*^{229}\mathrm{Pa}(\alpha)^{225}\mathrm{Ac}$		$E(\alpha)$ = 5670.2, 5630.2, 5615.2, 5580.2, 5536.2 (all 3,Z)										63Su.A	**
$^{230}\mathrm{Th}(p,t)^{228}\mathrm{Th}-^{232}\mathrm{Th}()^{230}\mathrm{Th}$		−492.5	.5	−492.3	0.5	.3	1	99	74 $^{228}\mathrm{Th}$			94Le22	
$^{231}\mathrm{U}(\alpha)^{227}\mathrm{Th}$		5576.9	3.				2					94Li12	*
$*^{231}\mathrm{U}(\alpha)^{227}\mathrm{Th}$		$E(\alpha)$ = 5471(3), 5456(3), 5404(3) to 9.3, 24.4, 77.7 levels										94Li12	**
$^{233}\mathrm{Np}(\alpha)^{229}\mathrm{Pa}$		5628.5	50.				3					50Ma14	
$^{235}\mathrm{Pu}(\alpha)^{231}\mathrm{U}$		5951.5	20.				3					57Th10	
$^{237}\mathrm{Pu}(\alpha)^{233}\mathrm{U}$		5747	5	5749.5	2.3	.5	1	22	16 $^{233}\mathrm{U}$			93Dm02	
$^{237}\mathrm{Am}(\alpha)^{233}\mathrm{Np}$		6180.6	5.				4					75Ah05	

Item		Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference	
$^{241}\mathrm{Cm}(\alpha)^{237}\mathrm{Pu}$		6182.8	2.0	6184.9	0.6	1.0	–					67Ba42	*
	ave.	6184.8	0.6			.1	1	99	94 $^{237}\mathrm{Pu}$			average	
$^{241}\mathrm{Es}(\alpha)^{237}\mathrm{Bk}^p$		8064.1	30.	8250	20	6.1	C					85Hi.A	*
		8250.2	20.				10					93Ho.A	
*$^{241}\mathrm{Cm}(\alpha)^{237}\mathrm{Pu}$	$E(\alpha)$ = 6080.6(2,Z), 5926.6(2,Z) to ground-state, 155.45 level											NDS	**
*$^{241}\mathrm{Es}(\alpha)^{237}\mathrm{Bk}^p$	C: new data of same group (next item) is much safer											93Ho.A	**
$^{242}\mathrm{Pu}(\alpha)^{238}\mathrm{U}$		4987.3	2.0	4984.4	0.9	−1.4	–					53As.A	*
		4986.8	2.0			−1.2	–					56Ko67	*
	ave.	4984.6	0.9			−.2	1	95	51 $^{238}\mathrm{U}$			average	
$^{242}\mathrm{Es}(\alpha)^{238}\mathrm{Bk}^p$		8043.2	20.	8024	17	−.9	11					93Ho.A	
$^{242}\mathrm{Np}^m(\beta^-)^{242}\mathrm{Pu}$		2700	200				2					79Ha26	
*$^{242}\mathrm{Pu}(\alpha)^{238}\mathrm{U}$	$E(\alpha)$ = 4904.6, 4860.6(2,Z) to ground-state, 44.91 level											NDS	**
*$^{242}\mathrm{Pu}(\alpha)^{238}\mathrm{U}$	$E(\alpha)$ = 4903.7, 4860.6(2,Z) to ground-state, 44.91 level											NDS	**
$^{243}\mathrm{Cf}(\alpha)^{239}\mathrm{Cm}^p$		7178	10				5					67Fi04	*
$^{243}\mathrm{Es}(\alpha)^{239}\mathrm{Bk}^p$		8027.3	20.	8031	3	.2	U					93Ho.A	
*$^{243}\mathrm{Cf}(\alpha)^{239}\mathrm{Cm}^p$	Unhindered $E(\alpha)$ = 7060(10); there is a weaker $E(\alpha)$ = 7170(10)											AHW	**
$^{244}\mathrm{Bk}(\alpha)^{240}\mathrm{Am}$		6778.3	4.				3					66Ah.B	*
$^{244}\mathrm{Pu}(t,\alpha)^{243}\mathrm{Np}^p$		12405	10				2					79Fl02	
*$^{244}\mathrm{Bk}(\alpha)^{240}\mathrm{Am}$	$E(\alpha)$ = 6667.5(4,Z), 6625.5(3,Z) to ground-state, 41 level											NDS	**
$^{245}\mathrm{Cf}(\alpha)^{241}\mathrm{Cm}^p$		7255.7	2.0				3					67Fi04	Z
$^{245}\mathrm{Md}^m(\alpha)^{241}\mathrm{Es}^p$		8780	50				12					93Ho.A	
$^{246}\mathrm{Md}(\alpha)^{242}\mathrm{Es}^p$		8670	50				13					93Ho.A	
$^{246}\mathrm{Md}^m(\alpha)^{242}\mathrm{Es}^p$		8880	50				13					93Ho.A	
$^{247}\mathrm{Md}^m(\alpha)^{243}\mathrm{Es}^p$		8567.0	25.	8564	16	−.1	11					81Mu12	
		8562.9	20.			.1	11					93Ho.A	
$^{248}\mathrm{Bk}^m(\beta^-)^{248}\mathrm{Cf}$		870	20				3					78Gr10	*
*$^{248}\mathrm{Bk}^m(\beta^-)^{248}\mathrm{Cf}$	In Ame'93, $1^{(-)}$ $^{248}\mathrm{Bk}^m$ was ground-state; but (6^+) $^{248}\mathrm{Bk}$ is gs.											NDS	**
$^{249}\mathrm{Bk}(\alpha)^{245}\mathrm{Am}$		5520.4	2.0	5525.0	2.3	2.3	4					66Ah.A	*
		5526.1	1.0			−1.1	4					71BaB2	*
*$^{249}\mathrm{Bk}(\alpha)^{245}\mathrm{Am}$	$E(\alpha)$ = 5431.8, 5412.8, 5384.8(all 2,Z) to ground-state, 19.20, 47.07 levels											NDS	**
*$^{249}\mathrm{Bk}(\alpha)^{245}\mathrm{Am}$	$E(\alpha)$ = 5437.1(1.0,Z) to ground-state. Energies of higher branches											71BaB2	**
*	rather different from ref., calibrated with same ground-state α											75Ba27	**
$^{250}\mathrm{Cf}(\alpha)^{246}\mathrm{Cm}$		6129.1	.6	6128.44	0.19	−1.1	2					71BaB2	
$^{252}\mathrm{Es}(\alpha)^{248}\mathrm{Bk}^p$		6739.5	3.				4					73Fi06	*
*$^{252}\mathrm{Es}(\alpha)^{248}\mathrm{Bk}^p$	$E(\alpha)$ = 6632.1(3,Z), 6522.1(3,Z) to 0, 70.64 above $^{248}\mathrm{Bk}^p$											NDS	**
$^{253}\mathrm{Cf}(\alpha)^{249}\mathrm{Cm}$		6127.3	5.	6126	4	−.3	3					66Rg01	*
*$^{253}\mathrm{Cf}(\alpha)^{249}\mathrm{Cm}$	$E(\alpha)$ = 5981(5,Z) to 48.74 level											NDS	**
$^{254}\mathrm{Es}(\alpha)^{250}\mathrm{Bk}$		6615.7	1.5				6					72BaD2	*
*$^{254}\mathrm{Es}(\alpha)^{250}\mathrm{Bk}$	$E(\alpha)$ = 6415.4(1.5,Z) to 97.493 level											NDS	**
$^{255}\mathrm{Es}(\alpha)^{251}\mathrm{Bk}$		6439.3	3.0	6436.3	1.3	−1.0	4					66Rg01	*
$^{255}\mathrm{Fm}(\alpha)^{251}\mathrm{Cf}$		7237.0	4.	7239.7	1.8	.7	3					64As01	*
$^{255}\mathrm{No}(\alpha)^{251}\mathrm{Fm}$		8428.4	20.	8442	8	.7	5					95Ho.A	
$^{255}\mathrm{Lr}(\alpha)^{251}\mathrm{Md}^p$		8563.6	18.				9					76Bc.A	*
*$^{255}\mathrm{Es}(\alpha)^{251}\mathrm{Bk}$	$E(\alpha)$ = 6303(3,Z) to 35.7(.3) level											NDS	**
*$^{255}\mathrm{Fm}(\alpha)^{251}\mathrm{Cf}$	$E(\alpha)$ = 7121.5, 7018.5(4,Z) to ground-state, 106.30 level											NDS	**
*$^{255}\mathrm{Lr}(\alpha)^{251}\mathrm{Md}^p$	$E(\alpha)$=8429(18); and a more intense 8370(18) branch											76Bc.A	**

Item	Input value		Adjusted value		v/s	Dg	Sig	Main flux	Lab	CF	Reference
$^{256}\mathrm{Lr}(\alpha)^{252}\mathrm{Md}^{p}$	8761.1	25.	8777	13	.6	4					76Be.A
	8777.4	20.			.0	4					76Di.A
$^{257}\mathrm{Lr}(\alpha)^{253}\mathrm{Md}^{p}$	9001.3	12.	9007	10	.4	4					76Be.A
$^{257}\mathrm{Jl}(\alpha)^{253}\mathrm{Lr}^{p}$	9122.1	20.				9					85He22 *
$*^{257}\mathrm{Jl}(\alpha)^{253}\mathrm{Lr}^{p}$	$E(\alpha)$ = 8970(20); highest seen 9160(20)										AHW **
$^{258}\mathrm{Lr}(\alpha)^{254}\mathrm{Md}$	8870	50	8900	20	.6	F					76Be.A *
$^{259}\mathrm{No}(\alpha)^{255}\mathrm{Fm}^{p}$	7617.8	10.	7635	4	1.7	5					73Si40 *
	7638.2	4.			−.7	5					93Mo18 *
$^{259}\mathrm{Db}(\alpha)^{255}\mathrm{No}^{p}$	9030	20	9021	12	−.4	7					81Be03 *
	9034.7	20.			−.7	7					95Ho.A
$^{259}\mathrm{Rf}(\alpha)^{255}\mathrm{Db}$	9834	30				11					85Mu11 *
$*^{259}\mathrm{No}(\alpha)^{255}\mathrm{Fm}^{p}$	Or E(favored) = 7551(4) if Coriolis mixed										NDS **
$*^{259}\mathrm{Db}(\alpha)^{255}\mathrm{No}^{p}$	$E(\alpha)$ = 8870(20); partly sum $E(\alpha)$ = 8770(20) with e^{-}										AHW **
$*^{259}\mathrm{Rf}(\alpha)^{255}\mathrm{Db}$	$E(\alpha)$ = 9620(30) probably to 9/2 63(10) above 7/2 ground-state										AHW **
$*^{259}\mathrm{Rf}(\alpha)^{255}\mathrm{Db}$	$E(\alpha)$ = 9030(50) maybe unhndrd to Nm $^{255}\mathrm{Db}^{p}$ at 660(60)										AHW **
$^{261}\mathrm{Rf}(\alpha)^{257}\mathrm{Db}^{p}$	9700.0	20.	9703	17	.1	11					95Ho03
$^{263}\mathrm{Db}(\alpha)^{259}\mathrm{No}^{p}$	8022	40				7					93Gr.C
$^{263}\mathrm{Rf}(\alpha)^{259}\mathrm{Db}^{q}$	9200.2	40.	9180	30	−.4	11					74Gh04
	9149.2	60.			.6	11					94Gr08
$^{263}\mathrm{Rf}^{m}(\alpha)^{259}\mathrm{Db}^{p}$	9393.1	40.	9391	18	.0	9					74Gh04
	9391.1	20.			.0	9					95Ho.A
$^{264}\mathrm{Bh}(\alpha)^{260}\mathrm{Jl}^{p}$	9767.3	20.				8					95Ho04
$^{264}\mathrm{Hn}(\alpha)^{260}\mathrm{Rf}$	10590.5	20.				10					95Ho.B
$^{265}\mathrm{Rf}(\alpha)^{261}\mathrm{Db}^{p}$	8945.3	60.				8					94La22
$^{265}\mathrm{Hn}(\alpha)^{261}\mathrm{Rf}^{q}$	10468.3	20.	10490	16	1.1	15					95Ho03
$^{265}\mathrm{Hn}^{m}(\alpha)^{261}\mathrm{Rf}^{p}$	10732.3	20.				13					95Ho03
$^{266}\mathrm{Rf}(\alpha)^{262}\mathrm{Db}$	8762.0	50.				6					94La22
$^{267}\mathrm{Hn}(\alpha)^{263}\mathrm{Rf}^{m}$	9980	50	10014	17	.7	10					94Hu.A
	10032.4	20.			−.9	10					95Ho.A
	9960	40			1.3	10					95Og.A
$^{267}\mathrm{Xa}(\alpha)^{263}\mathrm{Hn}^{p}$	11776.5	50.				14					95Gh04
$^{268}\mathrm{Mt}(\alpha)^{264}\mathrm{Bh}^{p}$	10395.5	20.				10					95Ho04
$^{269}\mathrm{Xa}(\alpha)^{265}\mathrm{Hn}^{m}$	11280.1	20.				14					95Ho03
$^{271}\mathrm{Xa}(\alpha)^{267}\mathrm{Hn}^{p}$	10899.2	20.				12					95Ho.A
$^{271}\mathrm{Xa}^{m}(\alpha)^{267}\mathrm{Hn}^{q}$	10869.8	20.				14					95Ho.A *
$*^{271}\mathrm{Xa}^{m}(\alpha)^{267}\mathrm{Hn}^{q}$	Possibly a longer-lived isomer										95Ho.A **
$^{272}\mathrm{Xb}(\alpha)^{268}\mathrm{Mt}^{p}$	10981.9	20.				12					95Ho04
$^{273}\mathrm{Xa}(\alpha)^{269}\mathrm{Hn}^{p}$	11519.1	50.				11					95Og.A

References to table III

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(an update of the list given in ref. [IV])

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76Be.A	AnRpt Oak Ridge			C.E. Bemis,Jr., P.F. Dittner, R.J. Silva, D.C. Hensley, R.L. Hahn, J.R. Tarrant, L.D. Hunt, and PrvCom AHW July 1981
76Cr.B	JINRP6- 9711			T. Cretzu, V.V. Kuznetsov, G. Luzurej, G. Macaric, M. Finger
76Di.A	AnRpt Oak Ridge			P.F. Dittner, R.J. Silva, D.C. Hensley, R.L. Hahn, J.R. Tarrant, L.D. Hunt, and PrvCom AHW July 1981
76Ga.A	P-Baku			M. Gasior, B.G. Kalinnikov, T. Kretsu
76Jo.A	P-Cargese 277			B. Jonson, E. Hagberg, P.G. Hansen, P. Hornshøj, P. Tidemand-Petersson, ISOLDE
76Ra37	ZPAAD	279,	301	D.G. Raich, H.R. Bowman, R.E. Epply, J.O. Rasmussen, J. Rezanka

1977

77Ke03	PRVCA	15,	792	G. Kennedy, J. Deslauriers, S.C. Gujrathi, S.K. Mark
77Lu06	NUPAB	286,	403	E. Lund, K. Aleklett, G. Rudstam
77Nu01	PRVCA	15,	444	L.L. Nunnely, W.D. Loveland
77Sc03	PYLBB	66,	133	A.G. Schmidt, R.L. Mlekodaj, E.L. Robinson, F.T. Avignone, J. Lin, G.M. Gowdy, J.L. Wood, R.W. Fink

1978

78Bo.A	P-Alma Ata 54			D.D. Bogdanov, I. Bobordzil, A.V. Demianov, L.A. Petrov
78Da07	NUPAB	301,	397	J.M. D'Auria, J.W. Grüter, E. Hagberg, P.G. Hansen, J.C. Hardy, P. Hornshøj, B. Jonson, S. Mattson, H.L. Ravn, P. Tidemand-Petersson
78Gr10	NUPAB	303,	265	H.C. Griffin, I. Ahmad, A.M. Friedman, L.E. Glendenin
78Sc26	ZPAAD	288,	189	U.J. Schrewe, W.D. Schmidt-Ott, R.D. von Dincklage, E. Georg, P. Lemmertz, H. Jungclas, D. Hirdes
78Tu04	PHSTB	18,	31	T. Tuurnala, R. Katajanheimo, O. Heinonen

1979

79Aj02	PRVCA	19,	1742	F. Ajzenberg-Selove, E.R. Flynn, D.L. Hanson, S. Orbesen
79Br.A	Th.-McMaster			P.M. Brewste
79Br26	ZPAAD	292,	397	F. Braumandl, T. von Egidy, D.D. Warner
79Fl02	PRVCA	19,	355	E.R. Flynn, D.L. Hansen, R.A. Hardekopf
79Ha10	NUPAB	318,	29	E. Hagberg, P.G. Hansen, P. Hornshøj, B. Jonson, S. Mattsson, P. Tidemand-Petersson, ISOLDE
79Ha26	PRVCA	19,	2332	P.E. Haustein, H.-C. Hseuh, R.L. Klobuchar, E.M. Franz, S. Katcoff, L.K. Peker
79Ho10	ZPAAD	291,	53	S. Hofmann, W. Faust, G. Münzenberg, W. Reisdorf, P. Armbruster, K. Güttner, H. Ewald
79Ik06	JUPSA	47,	1039	Y. Ikeda, H. Yamamoto, K. Kawade, T. Takeuchi, T. Katoh, T. Nagahara
79Sc09	NUPAB	318,	253	K.-H. Schmidt, W. Faust, G. Münzenberg, H.-G. Clerc, W. Lang, K. Pielenz, D. Vermeulen, H. Wohlfarth, H. Ewald, K. Güttner
79Sc22	NUPAB	326,	65	D. Schardt, R. Kirchner, O. Klepper, W. Reisdorf, E. Roeckl, P. Tidemand-Petersson, G.T. Ewan, E. Hagberg, B. Jonson, S. Mattsson, G. Nyman
79Ve.A	P-Lansing 431			J. Verplancke, D. Vandeplassche, M. Huyse, K. Cornelis, G. Lhersonneau

1980

80De02	ZPAAD	294,	35	R. Decker, K.D. Wünsch, H. Wollnik, E. Koglin, G. Siegert, G. Jung
80Ha20	PRVCA	22,	247	H.I. Hayakawa, I. Hyman, J.K.P. Lee

1981

81Be03	PRVCA	23,	555	C.E. Bemis,Jr., P.F. Dittner, R.L. Ferguson, D.C. Hensley, F. Placil, F. Pleasonton
81De38	ZPAAD	303,	151	J. Deslauriers, S.C. Gujrathi, S.K. Mark
81Ho10	ZPAAD	299,	281	S. Hofmann, G. Münzenberg, F. Heßberger, W. Reisdorf, P. Armbruster, B. Thuma
81Li12	PRVCA	24,	260	C.J. Lister, P.E. Haustein, D.E. Alburger, J.W. Olness
81Mu12	ZPAAD	302,	7	G. Münzenberg, S. Hofmann, W. Faust, F.P. Heßberger, B. Thuma, D. Vermeulen, W. Reisdorf, K.H. Schmidt, K. Kitihara, P. Armbruster, K. Güttner
81Ox01	ZPAAD	303,	63	K. Oxorn, S.K. Mark
81Va27	IANFA	45,	1861	V.M. Vakhtel, N.A. Golovkov, R.B. Ivanov, M.I. Mikhailova, A.F. Novgorodov, Y.V. Norseev, V.G. Chumin, Y.V. Yushkevich

1982

82Al29	PRVCA	26,	1157	K. Aleklett, P. Hoff, E. Lund, G. Rudstam
82Au01	NUPAB	378,	443	G. Audi, M. Epherre, C. Thibault, A.H. Wapstra, K. Bos
82Bo04	PRVCA	25,	941	J.D. Bowman, R.E. Epply, E.K. Hyde
82De11	ANPHA	7,	149	S. Della Negra, C. Deprun, D. Jacquet, Y. Le Beyec
82De36	ZPAAD	307,	305	S. Della Negra, H. Gauvin, D. Jacquet, Y. Le Beyec
82De43	ZPAAD	308,	243	S. Della Negra, D. Jacquet, Y. Le Beyec
82Vy06	IANFA	46,	2066	Ts. Vylov, V.G. Kalinnikov, V.V. Kuznetsov, Z.N. Li, A.A. Solnyshkin, Y.U. Yuskevich

1983

83Al06	ZPAAD	310,	247	G.D. Alkhazov, K.A. Mezilev, Yu.N. Novikov, N. Ganbaatar, K. Ya. Gromov, V.G. Kalinnikov, A. Potempa, E. Sieniawski, F. Tarkanyi
83Ch08	ZPAAD	310,	135	A. Chalupka, H. Vonach, E. Hueges, H.J. Scheerer
83Ge08	NIMAE	211,	89	W. Gelletly
83Gn01	NUPAB	406,	29	B.E. Gnade, R.E. Fink, J.L. Wood
83Ia02	JCHCA	61,	694	R. Iafigliola, M. Chatterjee, H. Dautet, J.K.P. Lee
83Le.A	Th.-Helsinki			M. Leino (Report HU-P-D37)

83Ra04 PRVCA 27, 1188 S. Raman, E.T. Jurney, D.A. Outlaw, I.S. Towner
83Ve06 IANFA 47, 834 G.V. Veselov, N. Ganbaatar, Ya. Kormitski, Yu.N. Novikov, A. Potempa, E. Senyavski, V.A. Sergienko, F. Tarkani
83Vo.A PrvCom AHW Jul H. Vonach

1984

84Al36 IANFA 48, 834 G.D. Alkhazov, N. Ganbaatar, K. Ya. Gromov, V.K. Kalinnikov, K.A. Mezilev, Yu.N. Novikov, A.M. Nurmhukhamedov, A. Potempa, F. Tarkani
84Bl.A P-Darmstadt134 F. Blönnigen, G. Bewersdorf, C. Geisse, W. Lippert, B. Pfeiffer, U. Stöhlker, H. Wollnik
84Br.A AnRpt IPN 13 F. Bragança Gil, C. Bourgeois, P. Kilcher, M.G. Porquet, B. Roussière, J. Sauvage, ISOCELE
84Da.A P-Darmstadt257 H. Dautet, N. Campeau, J.K.P. Lee, C. Bourgeois, B. Roussière, A. Houdayer
84Ha.A P-Darmstadt 89 W. Hampel, R. Schlotz
84Sc.A GSI-84-3 J. Schneider Thesis
84Sc.B P-Darmstadt203 U.J. Schrewe, P. Tidemand-Petersson, H. Behrens, H. Dornhöfer, R. Michaelsen, E. Runte, W.-D. Schmidt-Ott, E. Voth
84Sc06 ZPAAD 315, 49 U.J. Schrewe, E. Hagberg, H. Schmeing, J.C. Hardy, V.T. Koslowsky, K.S. Sharma

1985

85Af.A P-Leningrd1083 V.P. Afanasiev, Yu.S. Blinnikov, N. Ganbaatar, V. Dzeleznyakov, V.G. Kalinikov, Ya. Kormitski, K.A. Mezilev, Yu.N. Novikov, A.M. Nurmudzamedov, V.N. Panteleev, A.G. Polyakov, A. Potempa, F. Tarkani
85Al08 NUPAB 438, 482 G.D. Alkhazov, A.A. Bykov, V.D. Wittmann, V.E. Starodubsky, S.Y. Orlov, V.N. Panteleyev, A.G. Polyakov, V.K. Tarasov
85Ha12 PRVCA 31, 1594 F.X. Hartmann, R.A. Naumann
85He22 ZPAAD 322, 557 F.P. Heßberger, G. Münzenberg, S. Hofmann, Y.K. Agarwal, K. Poppensieker, W. Reisdorf, K.-H. Schmidt, J.R.H. Schneider, W.F.W. Schneider, H.J. Schött, P. Armbruster, B. Thuma, C.-C. Sahm, D. Vermeulen
85Hi.A AnRpt GSI 88 R. Hingmann, W. Kuehn, V. Metag, R. Novotny, A. Ruckelshausen, H. Stroeher, F.P. Heßberger, S. Hofmann, G. Münzenberg, W. Reisdorf
85Mu11 ZPAAD 322, 227 G. Münzenberg, S. Hofmann, H. Folger, F.P. Heßberger, J. Keller, K. Poppensieker, B. Quint, W. Reisdorf, K.-H. Schmidt, H.J. Schött, P. Armbruster, M.E. Leino, R. Hingmann

1986

86Au02 NUPAB 449, 491 G. Audi, A. Coc, M. Epherre, G. Le Scornet, C. Thibault, F. Touchard, ISOLDE
86Ke03 NUPAB 452, 173 J.G. Keller, K.-H. Schmidt, F.P. Heßberger, G. Münzenberg, W. Reisdorf, H.-G. Clerc, C.-C. Sahm and PrvCom K.-H. Schmidt to AHW November 1992
86Ve.A P-Charkov 107 G.V. Veselov, K.A. Mezilev, Yu.N. Novikov, A.V. Lopov, V.A. Sergienko

1987

87Gr.A P-Rosseau 30 M. Graefenstedt, U. Keyser, F. Münnich, F. Schreiber
87He10 EULEE 3, 895 F.P. Heßberger, S. Hofmann, G. Münzenberg, A.B. Quint, K. Sümmerer, P. Armbruster
87He21 NUPAB 474, 484 K. Heiguchi, S. Mitarai, B.J. Min, T. Kuroyanagi
87Ki.A P-Rosseau 517 P. Kilcher, J. Sauvage, C. Bourgeois, F. Le Blanc, J. Oms, B. Roussière, J. Munsch, J. Obert, A. Caruette, A. Ferro, G. Boissier, J. Fournet-Fayas, M. Ducourtieux, G. Landois, R. Sellem, D. Sznadjderman, ISOCELE, A. Wojtasiewicz, M.C. Abreu, A. Ben Braham, K. Fransson, M.G. Porquet
87Sp02 PLRAA 35, 679 P.T. Springer, C.L. Bennett, P.A. Baisden
87Sp09 NUPAB 474, 359 L. Spanier, K. Aleklett, B. Ekström, B. Fogelberg

1989

89Gr23 ZPAAD 334, 239 M. Graefenstedt, P. Jürgens, U. Keyser, F. Münnich, F. Schreiber, K. Balog, T. Winkelmann, H.R. Faust
89Ho12 ZPAAD 333, 107 S. Hofmann, P. Armbruster, G. Berthes, T. Faestermann, A. Gillitzer, F.P. Heßberger, W. Kurcewicz, G. Münzenberg, K. Poppensieker, H.J. Schött, I. Zychor

1990

90AjSe NUPAB 506, 1 F. Ajzenberg-Selove and PrvCom AHW
90Ak04 PRVCA 42, 1130 Y.A. Akovali, K.S. Toth, C.R. Bingham, M.B. Kassim, M. Zhang, H.K. Carter, W.D. Hamilton, J. Kormicki
90Am05 YAFIA 52, 1231 A.I. Amelin, M.G. Gornov, Y.B. Gurov, A.L. Il'in, P.V. Morokhov, V.A. Pechkurov, V.I. Savelev, F.M. Sergeev, S.A. Smirnov, B.A. Chernyshev, R.R. Shafigullin, A.V. Shishkov

90Bo39 YAFIA 52, 358 D.D. Bogdanov, V.P. Bugrov, S.G. Kadmenskiĭ
90Bo52 IANFA 54, 1787 S.T. Boneva, E.V. Vasileva, V.D. Kulik, L.K. Khem, Yu.P. Popov, A.M. Sukhovoi, V.A. Khitrov,Yu.V. Kholnov
90Endt NUPAB 521, 1 P.M. Endt
90Is07 PRVCA 42, 207 M.A. Islam, T.J. Kennett, W.V. Prestwich
90So08 PRAMC 35, 329 P.C. Sood, R.K. Sheline
90Sp.A PrvCom AHW Jun L. Spanier, B. Fogelberg, M. Hellström, K. Aleklett, L. Sihver
90St13 ZPAAD 336, 369 U. Stöhlker, A. Blönnigen, W. Lippert, H. Wollnik
90Tu01 ZPAAD 337, 361 X.L. Tu, X.G. Zhou, D.J. Vieira, J.M. Wouters, Z.Y. Zhou, H.L. Seifert, V.G. Lind

1991

91Bi04 PRVCA 44, 1208 C.R. Bingham, M.B. Kassim, M. Zhang, Y.A. Akovali, K.S. Toth, W.D. Hamilton, H.K. Carter, J. Kormicki, J. von Schwarzenberg, M.M. Jarrio
91Fi03 PRVCA 43, 1066 R.B. Firestone, J. Gilat, J.M. Nitschke, P.A. Wilmarth, K.S. Vierinen
91He21 ZPAAD 340, 225 F. Heine, T. Faestermann, A. Gillitzer, J. Homolka, M. Köpf, W. Wagner, see also 92He. A
91Ho08 CZYPA 41, 525 J. Honzatko, K. Konecny, Z. Kosina
91Jo11 ZPAAD 340, 21 A. Jokinen, J. Äystö, P. Dendooven, K. Eskola, Z. Janas, P.P. Jauho, M.E. Leino, J.M. Parmonen, H. Penttilä, K. Rykaczewski, P. Taskinen
91Ju05 ZPAAD 340, 125 A. Jungclaus, K.P. Lieb, C.J. Gross, J. Heese, D. Rudolph, D.J. Blumenthal, P. Chowdhury, P.J. Ennis, C.J. Lister, C. Winter, J. Eberth, S. Skoda, M.A. Bentley, W. Gelletly, B.J. Varley
91Ke11 ZPAAD 340, 363 H. Keller, R. Kirchner, O. Klepper, E. Roeckl, D. Schardt, R.S. Simon, P. Kleinheinz, R. Menegazzo, C.F. Liang, P. Paris, K. Rykaczewski, J.Żylicz, and Thesis H. Keller THD report GSI-91-6 February 1991
91Ly01 PRVCA 44, 764 J.E. Lynn, E.T. Jurney, S. Raman
91Mi15 NUPAB 530, 211 B.J. Min, S. Suematsu, S. Mitarai, T. Kuroyanagi, K. Heiguchi, M. Matsuzaki
91Ry01 ADNDA 47, 205 A. Rytz
91To08 PRVCA 44, 1868 K.S. Toth, K.S. Vierinen, M.O. Kortelahti, D.C. Sousa, J.M. Nitschke, P.A. Wilmarth
91Va04 NUPAB 529, 268 P. Van Duppen, P. Decrock, P. Dendooven, M. Huyse, G. Reusen, J. Wauters

1992

92An.A P-Bernkastl759 A.N. Andreyev, D.D. Bogdanov, V.I. Chepigin, M. Florek, A.P. Kabachenko, O.N. Malyshev, S. Saro, G.M. Ter-Akopian, M. Veselsky, A.V. Yeremin
92Ba.A P-Bernkastl777 P.H. Barker, S.A. Brindhaban
92Bo.D P-Bernkastl743 V.A. Bolshakov, A.G. Demjatin, K.A. Mezilev, Yu.N. Novikov, A.V. Popov, Yu. Ya. Sergeev, V.I. Tikhonov, V.A. Sergienko, G.V. Veselov
92Gr.A P-Bernkastl 77 M. Groß, P. Jürgens, S. Kluge, M. Mehrtens, S. Müller, F. Münnich, J. Wulff, see also 87Gr18
92Ha10 PRVCA 45, 1609 E. Hagberg, X.J. Sun, V.T. Koslowsky, H. Schmeing, J.C. Hardy
92He.A P-Bernkastl331 F. Heine, T. Faestermann, A. Gillitzer, H.J. Körner
92Hu04 PRVCA 46, 1209 M. Huyse, P. Decrock, P. Dendooven, G. Reusen. P. Van Duppen, J. Wauters
92Ju01 PRLTA 69, 2164 M. Jung, F. Bosch, K. Beckert, H. Eickhoff, H. Folger, B. Franzke, A. Gruber, P. Kienle, O. Klepper, W. Koenig, C. Kozhuharov, R. Mann, R. Moshammer, F. Nolden, U. Schaaf, G. Soff, P. Spädtke, M. Steck, T. Stöhlker, K. Sümmerer
92Me10 ZPAAD 343, 283 F. Meissner, H. Salewski, W.-D. Schmidt-Ott, U. Bosch-Wicke, R. Michaelsen
92Os04 ZPAAD 343, 489 A.N. Ostrowski, H.G. Bohlen, A.S. Demyanova, B. Gebauer, R. Kalpakchieva, Ch. Langner, H, Lenske, M. von Lucke-Petsch, W. von Oertzen, A.A. Ogloblin, Y.E. Penionzhkevich, M. Wilpert, Th. Wilpert
92Pr03 ZPAAD 342, 23 M. Przewloka, A. Przewloka, P. Wächter, H. Wollnik
92Sc16 NUPAB 545, 646 W.-D. Schmidt-Ott, H. Salewski, F. Meissner, U. Bosch-Wicke, P. Koschel, V. Kunze, R. Michaelsen

1993

93Ab11 PYLBB 316, 26 H. Abele, G. Helm, U. Kania, C. Schmidt, J. Last, D. Dubbers
93Al03 ZPAAD 344, 425 G.D. Alkhazov, L.H. Batist, A.A. Bykov, F.V. Moroz, S. Yu. Orlov, V.K. Tarasov, V.D. Wittmann
93An07 ZPAAD 345, 247 A.N. Andreyev, D.D. Bogdanov, V.I. Chepigin, A.P. Kabachenko, O.N. Malyshev, R.N. Sagaidak, G.M. Ter-Akopian, M. Veselsky, A.V. Yeremin
93An19 NIMAE 330, 125 A.N. Andreyev, D.D. Bogdanov, V.I. Chepigin, V.A. Gorshkov, K.V. Mikhailov, A.P. Kabachenko, G.S. Popeko, S. Daro, G.M. Ter-Akopian, A.V. Yeremin
93As02 PRVCA 47, 2954 K. Ashktorab, J.W. Jänecke, F.D. Becchetti, D.A. Roberts
93Be21 PRVCA 48, R1 G.E. Berman, M.L. Pitt, F.P. Calaprice, M.M. Lowry
93Bo.A AnRpt GSI 65 F. Bosch, M. Jung
93Bo01 NUPAB 551, 54 V.A. Bondarenko, I.L. Kuvaga, P.T. Prokofjev, V.A. Khitrov, Yu.V. Kholnov, Le Hong Khiem, Yu.P. Popov, A.M. Sukhovoj, S. Brant, V. Paar, V. Lopac
93Bo03 ZPAAD 344, 381 H.G. Bohlen, B. Gebauer,M. von Lucke-Petsch, W. von Oertzen, A.N. Ostrowski, M. Wilpert, Th. Wilpert, H. Lenske, D.V. Alexandrov, A.S. Demyanova, E. Nikolskii, A.A. Korsheninnikov, A.A. Ogloblin, R. Kalpakchieva, Y.E. Penionzhkevich, Š. Piskoř
93Ch21 PRVCA 48, 109 R.E. Chrien, B.K.S. Koene, M.L. Stelts, R.A. Meyer, S. Brant, V. Paar, V. Lopac
93Di03 PRVCA 47, 2916 D.E. DiGregorio, S. Gil, H. Huck, E.R. Batista, A.M.J. Ferrero, A.O. Gattone
93Dm02 ARISE 44, 1097 S.N. Dmitriev, Yu. Ts. Oganessian, G.V. Buklabov, Yu.P. Kharitonov, A.F. Novgorodov, L.I. Salamatin, G. Ya. Starodub, S.V. Shishkin, Yu.V. Yushkevich, D. Newton

93Do05	PRVCA	47,	2560	J. Döring, J.W. Holcomb, T.D. Johnson, M.A. Riley, S.L. Tabor, P.C. Womble, G. Winter
93Eg.A	PrvCom AHW Oct			T. von Egidy
93Go37	PRVAA	47,	3433	M.V. Gorshkov, G.M. Alber, L. Schweikhard, A.G. Marshall
93Go38	IJMPD	128,	47	M.V. Gorshkov, S. Guan, A.G. Marshall
93Gr.C	AnRpt Brkly 76			K.E. Gregorich, C.D. Kacher, M.F. Mohar, D.M. Lee, M.R. Lane, E.R. Sylwester, D.C. Hoffman, M. Schäeel, W. Brüchle, J.V. Kratz, R. Günther
93Gr17	NIMAE	337,	106	R.C. Greenwood, M.H. Putnam
93Ha05	ZPAAD	345,	143	A. Harder, S. Michaelsen, K.P. Lieb, A.P. Williams
93Ho.A	AnRpt GSI 64			S. Hofmann, V. Ninov, F.P. Heßberger, H. Folger, G. Münzenberg, H.J. Schött, P. Armbruster, A.N. Andreyev, A.G. Popeko, A.V. Yeremin, M.E. Leino, R. Janik, S. Saro, M. Veselsky and PrvCom AHW September 1995
93Je06	PHSTB	48,	399	R. Jertz, D. Beck, G. Bollen, J. Emmes, H.-J. Kluge, E. Schark, S. Schwarz, T. Schwarz, L. Schweikhard, P. Senne C. Carlberg, I. Bergström, H. Borgenstrand, G. Rouleau, R. Schuch, F. Söderberg
93Li18	PYLBB	312,	46	K. Livingston, P.J. Woods, T. Davinson, N.J. Davis, S. Hofmann, A.N. James, R.D. Page, P.J. Sellin, A.C. Shotter
93Li34	PRVCA	48,	2151	K. Livingston, P.J. Woods, T. Davinson, N.J. Davis, S. Hofmann, A.N. James, R.D. Page, P.J. Sellin, A.C. Shotter
93Ma50	NUPAB	565,	543	G. Mairle, M. Seeger, H. Reinhardt, T. Kihm, K.T. Knöpfle, Chen Lin Wen
93Mo18	NUPAB	563,	21	K.J. Moody, R.W. Lougheed, J.F. Wilde, R.J. Dougan, E.K. Hulet, R.W. Hoff, C.M. Henderson, R.J. Dupzyk, R.L. Hahn, K. Sümmerer,G.D. O'Kelley, G.R. Bethune
93Oh02	PRVDA	47,	4840	T. Ohshima, H. Sakamoto, T. Sato, J. Shirai, T. Tsukamoto, Y. Sugaya, K. Takahashi, T. Suzuki, C. Rosenfeld, S. Wilson, K. Ueno, Y. Yonezawa, H. Kawakami, S. Kato, S. Shibata, K. Ukai
93Os06	NIMAE	332,	169	A. Osa, T. Ikuta, M. Shibata, M. Miyachi, H. Yamamoto, K. Kawade, Y. Kawase, S. Ichikawa
93Ru01	ADNDA	53,	1	G. Rudstam, K. Aleklett, L. Sihver
93Se04	PRVCA	47,	1933	P.J. Sellin, P.J. Woods, T. Davinson, N.J. Davis, K. Livingston, R.D. Page, A.C. Shotter, S. Hofmann, A.N. James
93Se09	ZPAAD	346,	323	P.J. Sellin, P.J. Woods, T. Davinson, N.J. Davis, A.N. James, K. Livingston, R.D. Page, A.C. Shotter
93Sh07	JPHGB	19,	617	R.K. Sheline, J. Kvasil, C.F. Liang, P. Paris
93Si05	NIMAE	330,	195	M.H. Sidky, J.G. Hyckawy, G.R. Dyck, R.C. Barber, K.S. Sharma, C.A. Lander, H.E. Duckworth
93Sp.A	AnRpt JYFL 95			A.M. Spits, P.H.M. Van Assche, H.G. Bomer, W.F. Davidson, D.D. Warner, K. Schreckenbach, G.G. Colvin, R.C. Greenwood, C.W. Reich, P.O. Lipas, J. Suhonen, P. Sinkko, A. Backlin
93Va.A	BAPSA	38,	946	R.S. Van Dyck,Jr., D.L. Farnham, P.B. Schwinberg
93Va.B	BAPSA	38,	947	R.S. Van Dyck,Jr., D.L. Farnham, P.B. Schwinberg
93Wa03	ZPAAD	345,	21	J. Wauters, P. Dendooven, M. Huyse, G. Reusen, P. Van Duppen, R. Kirchner, O. Klepper, E. Roeckl
93Wa04	PRVCA	47,	1447	J. Wauters, P. Dendooven, M. Huyse, G. Reusen, P. Van Duppen, P. Lievens, ISOLDE
93Wi05	PRLTA	70,	1759	F.E. Wietfeldt, Y.D. Chan, M.T.F. da Cruz, A. Garcia, R.-M. Larimer, K.T. Lesko, E.B. Norman,R.G. Stokstad, I. Žlimen
93Yo07	PRLTA	71,	4124	B.M. Young, W. Benenson, M. Fauerbach, J.H. Kelley, R. Pfaff, B.M. Sherrill, M. Steiner, J.S. Winfield, T. Kubo, M. Hellström, N.A. Orr, J. Stetson, J.A. Winger, S.J. Yennello

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94Ah03	NUPAB	576,	246	I. Ahmad, J.E. Gindler, M.P. Carpenter, D.J. Henderson, E.F. Moore, R.V.F. Janssens, I.G. Bearden, C.C. Foster
94An01	NUPAB	568,	323	A.N. Andreyev, D.D. Bogdanov, V.I. Chepigin, A.P. Kabachenko, O.N. Malyshev, Yu.A. Muzychka, B.I. Pustylnik, G.M. Ter-Akopian, A.V. Yeremin
94An02	ZPAAD	347,	225	A.N. Andreyev, D.D. Bogdanov, V.I. Chepigin, A.P. Kabachenko, O.N. Malyshev, A.G. Popeko, R.N. Sagaidak, G.M. Ter-Akopian, M. Veselsky, A.V. Yeremin
94Ba06	PRVCA	49,	1221	V. Banerjee, A. Banerjee, G.S.N. Murthy, R.P. Sharma, S.K. Pardha Saradhi, A. Chakrabarti
94Br11	PRVCA	49,	2401	S.A. Brindhaban, P.H. Barker
94Br37	NIMAE	340,	436	S.A. Brindhaban, P.H. Barker, M.J. Keeling, W.B. Wood
94De32	PYLBB	331,	271	P. Descouvemont
94Di.A	P-Boulder 149			F. DiFilippo, V. Natarajan, M. Bradley, F. Palmer, D.E. Pritchard
94Gi07	PRVCA	50,	2612	R.L. Gill
94Go.A	PrvCom AHW Jul			M.V. Gorshkov
94Gr07	PRVCA	49,	2971	P. Grabmayer, A. Mondry, G.J. Wagner, P. Woldt, G.P.A. Berg, J. Lisantti, D.W. Miller, H. Nann, E.J. Stephenson
94Gr08	PRLTA	72,	1423	K.E. Gregorich, M.R. Lane, M.F. Mohar, D.M. Lee, C.D. Kacher, E.R. Sylwester, D.C. Hoffman
94Ha.A	Th.-Mainz			H. Hartmann
94Hi04	PRVCA	49,	3289	M.M. Hindi, R.L. Kozub, S.J. Robinson
94Hu.A	PrvCom AHW Jun			E.K. Hulet et al.
94Hy01	PRVCA	50,	1249	J.G. Hykawy, R.C. Barber, K.S. Sharma, K.J. Aarts, J.N. Nxumalo, H.E. Duckworth
94Ib01	ZPAAD	350,	9	F. Ibrahim, P. Kilcher, B. Roussière, J. Sauvage, J. Genevey, A. Gizon, A. Knipper, G. Marguier, D. Barnéoud, R. Béraud, G. Cata-Danil, J. Blachot, I. Deloncle, R. Duffait, A. Emsallem, D. Hojman, A.J. Kreiner, F. Le Blanc, J. Libert, J. Oms
94Ju.A	PrvCom AHW Jun			E.T. Jurney, J.E. Lynn, J.W. Starner, S. Raman

94Ko16	PYLBB	326,	31	A.A. Korsheninnikov, K. Yoshida, D.V. Aleksandrov, N. Aoi, Y. Doki, N. Inabe, M. Fujimaki, T. Kobayashi, H. Kumagai, C.-B. Moon, E. Yu. Nikolskii, M.M. Obuti, A.A. Ogloblin, A. Ozawa, S. Shimoura, T. Suzuki, I. Tanihata, Y. Watanabe, M. Yanokura
94La22	PRLTA	73,	624	Yu.A. Lazarev, Yu.V. Lobanov, Yu. Ts. Oganessian, V.K. Utyonkov, F. Sh. Abdullin, G.V. Buklanov, B.N. Gikal, S. Iliev, A.N. Mezentsev, A.N. Polyakov, I.M. Sedykh, I.V. Shirokovsky, V.G. Subbotin, A.M. Sukhov, Yu.S. Tsyganov, V.E. Zhuchko, R.W. Lougheed, K.J. Moody, J.F. Wild, E.K. Hulet, J.H. McQuaid
94Le05	ZPAAD	348,	151	M. Leino, J. Uusitalo, T. Enqvist, K. Eskola, A. Jokinen, K. Loberg, W.H. Trzaska, J. Äystö
94Le22	NUPAB	576,	267	A.I. Levon, J. de Boer, G. Graw, R. Hertenberger, D. Hofer, J. Kvasil, A. Lösch, E. Müller-Zanotti, M. Würkner, H. Baltzer, V. Grafen, C. Günther
94Li12	PRVCA	49,	2230	C.F. Liang, R.K. Sheline, P. Paris, M. Hussonois, J.F. Ledu, D.B. Isabelle
94Li20	PRVCA	49,	3098	S. Lin, S.A. Brindhaban, P.H. Barker
94Ma14	PRVCA	49,	1755	P.V. Magnus, E.G. Adelsberger, A. Garcia
94Os04	PYLBB	338,	13	A.N. Ostrowski, H.G. Bohlen, B. Gebauer, S.M. Grimes, R. Kalpakchieva, Th. Kirchner, T.N. Massey, W. von Oertzen, Th. Stolla, M. Wilpert, Th. Wilpert
94Ot01	NUPAB	567,	281	T. Otto, G. Bollen, G. Savard, L. Schweikhard, H. Stolzenberg, G. Audi, R.B. Moore, G. Rouleau, J. Szerypo, Z. Patyk, ISOLDE
94PaDG	PRVDA	50,	1173	Particle Data Group
94Pa11	PRVCA	49,	3312	R.D. Page, P.J. Woods, R.A. Cunningham, T. Davinson, N.J. Davis, A.N. James, K. Livingston, P.J. Sellin, A.C. Shotter
94Pa12	PRLTA	72,	1798	R.D. Page, P.J. Woods, R.A. Cunningham, T. Davinson, N.J. Davis, A.N. James, K. Livingston, P.J. Sellin, A.C. Shotter
94Po26	IANFA	58,	41	A.V. Potempa, G.V. Veselov, V.A. Sergienko, K. Ya. Gromov, S.V. Evtisov, V.G. Kalinnikov, V.V. Kuznetsov, Zh. Sereeter, V.I. Fominykh, M.B. Yuldashev
94Se12	ZPAAD	349,	25	H.L. Seifert, J.M. Wouters, D.J. Vieira, H. Wollnik, X.G. Zhou, X.L. Tu, Z.Y. Zhou, G.W. Butler
94Sh02	PRVCA	49,	725	R.K. Sheline, C.F. Liang, P. Paris, A. Gizon, V. Barci
94Sh07	ZPAAD	348,	25	T. Shizuma, M. Kidera, E. Ideguchi, A. Odahara, H. Tomura, S. Suematsu, T. Kuroyanagi, Y. Gono, S. Mitarai, J. Mukai, T. Komatsubara, K. Furuno, K. Heiguchi
94Ti03	PRVCA	49,	2871	R.J. Tighe, D.M. Moltz, J.C. Batchelder, T.J. Ognibene, M.W. Rowe, J. Cerny
94To10	PRVCA	50,	518	K.S. Toth
94Wa.A	B-Seyssins			W.B. Walters, C.A. Stone
94Wa17	PRVCA	50,	487	C. Wagemans, S. Druyts, P. Geltenbort
94Wa23	PRVCA	50,	2768	J. Wauters, N. Bijnens, H. Folger, M. Huyse, H.Y. Hwang, R. Kirchner, J. von Schwarzenberg, P. Van Duppen
94We02	ZPAAD	347,	185	Ch. Wennemann, W.-D. Schmidt-Ott, T. Hild, K. Krumbholtz, V. Kunze, F. Meissner, H. Keller, R. Kirchner, E. Roeckl
94Ya07	PYLBB	334,	229	S. Yasumi, H. Maezawa, K. Shima, Y. Inagaki, T. Mukoyama, T. Mizogawa, K. Sera, S. Kishimoto, M. Fujioka, K. Ishii, T. Omori, G. Izawa, O. Kawakami
94Ye08	NIMAE	350,	608	A.V. Yeremin, A.N. Andreyev, D.D. Bogdanov, G.M. Ter-Akopian, V.I. Chepigin, V.A. Gorshkov, A.P. Kabachenko, O.N. Malyshev, A.G. Popeko, R.N. Sagaidak, S. Sharo, E.N. Voronkov, A.V. Taranenko, A.Y. Lavrentjev
94Yo01	PRVCA	49,	279	B.M. Young, W. Benenson, J.H. Kelley, N.A. Orr, R. Pfaff, B.M. Sherrill, M. Steiner, M. Thoennessen, J.S. Winfield, J.A. Winger, S.J. Yennello, A. Zeller

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95Al.A	P-Arles 329			D.V. Aleksandrov, E. Yu. Nikol'skii, B.G. Novatskii, D.N. Stepanov
95Ap.A	PrvCom GAu May			A. Aprahamian, D.S. Brenner, R. Gill, A. Piotrowski, R.F. Casten
95Ba.B	P-Arles 541			J.C. Batchelder, K.S. Toth, D.M. Moltz, T.J. Ognibene, M.W. Rowe, C.R. Bingham, E.F. Zganjar, B.E. Zimmerman
95Be.A	PrvCom GAu Jun			D. Beck (Preliminary Data)
95Bi01	PRVCA	51,	125	C.R. Bingham, M.B. Kassim, M. Zhang, Y.A. Akovali, K.S. Toth, W.D. Hamilton, H.K. Carter, J. Kormicki, J. von Schwarzenberg, M.M. Jario
95Bi.B	P-Arles 543			N. Bijnens, G. Correia, P. Decrock, S. Franchoo, M. Gaelens, M. Huyse, H.Y. Hwang, A. Jokinen, I. Reusen, J. Szerypo, J. von Schwarzenberg, P. Van Duppen, J. Wauters, ISOLDE
95Bo.1	NUPAB to be pd			G. Bollen, H.-J. Kluge, Th. Otto, G. Savard, L. Schweikhard, H. Stolzenberg, G. Audi, R.B. Moore, G. Rouleau, J. Szerypo, Z. Patyk, ISOLDE
95Bo03	NUPAB	582,	1	V.A. Bondarenko, I.L. Kuvaga, P.T. Prokofjev, A.M. Sukhovoj, V.A. Khitrov, Yu.P. Popov, S. Brant, V. Paar
95Bo05	NUPAB	584,	279	V.A. Bondarenko, I.L. Kuvaga, P.T. Prokofjev, A.M. Sukhovoj, V.A. Khitrov, Yu.P. Popov, S. Brant, V. Paar, Lj. Šimičic
95Bo10	NUPAB	583,	775	H.G. Bohlen, B. Gebauer, Th. Kirchner, M. von Lucke-Petsch, W. von Oertzen, A.N. Ostrowski, Ch. Seyfert, Th. Stolla, M. Wilpert, Th. Wilpert, S.M. Grimes, T.N. Massey, R. Kalpakchieva, Y.E. Penionzhkevich, D.V. Alexandrov, I. Mukha, A.A. Ogloblin, C. Détraz
95Bo.A	PrvCom GAu May			H.G. Bohlen
95Ca.A	P-Arles 787			C. Carlberg, H. Borgenstrand, F. Söderberg, G. Rouleau, R. Schuch, I. Bergström, L. Liljeby, R. Jertz, J. Stein, T. Schwarz, G. Bollen, H.-J. Kluge, R. Mann
95Da14	ZPAAD	351,	225	M. Daszewski, Z. Janas, W. Kurcewicz, B. Szweryn
95Da.A	P-Arles 263			C.N. Davids, P.J. Woods, J.C. Batchelder, C.R. Bingham, D.J. Blumenthal, L.T. Brown, B.C. Busse, L.F. Conticchio, T. Davinson, S.J. Freeman, M. Freer, D.J. Henderson, R.J. Irvine, R.D. Page, H.T. Penttilä, A.V. Ramayya, D. Seweryniak, K.S. Toth, W.B. Walters, A.H. Wuosmaa, B.E. Zimmerman and PrvCom GAu June 1995

95Ga.A	P-Arles 595			A. Gadea, B. Rubio, J.L. Tain, J. Bea, L. Garcia-Raffi, J. Rico, L. Batist, V. Wittmann, A. Bykov, F. Moroz, H. Keller, R. Kirchner, E. Roeckl
95Gh04	NUPAB	583,	861c	A. Ghiorso, D. Lee, L.P. Somerville, W. Loveland, J.M. Nitschke, W. Ghiorso, G.T. Seaborg, P. Wilmarth, R. Leres, A. Wydler, M. Nurmia, K. Gregorich, R. Gaylord, T. Hamilton, N.J. Hannink, D.C. Hoffman, C. Jarzynski, C. Kacher, B. Kadkhodayan, S. Kreek, M. Lane, A. Lyon, M.A. McMahan, M. Neu, T. Sikkeland, W.J. Swiatecki, A. Türler, J.T. Walton, S. Yashita
95Gr.A	PrvCom GAu Apr			K. Ya. Gromov, G.V. Veselov, V.G. Kalinnikov, N. Yu. Kotovski, A.V. Potempa, V.A. Sergienko, V.I. Fominykh, M.B. Yuldashev
95Gu01	NUPAB	583,	867c	A. Guglielmetti, B. Blank, R. Bonetti, Z. Janas, H. Keller, R. Kirchner, O. Klepper, A. Piechaczek, A. Płochocki, G. Poli, P.B. Price, E. Roeckl, K. Schmidt, J. Szerypo, A.J. Westphal
95Ha.1	NUPAB to be pd			H. Hartmann, G. Bollen, H.-J. Kluge, G. Savard, G. Audi, R.B. Moore, J. Szerypo, ISOLDE
95He.A	P-Arles 565			F. Heine, R. Schneider, T. Faestermann, J. Friese, J. Homolka, P. Kienle, H.J. Körner, J. Reinhold, K. Zeitelhack, H. Geissel, G. Münzenberg, K. Sümmerer
95Hi02	PRVCA	51,	1736	T. Hild, W.-D. Schmidt-Ott, V. Kunze, F. Meissner, C. Wennemann, H. Grawe
95Hi.1	JPHGB	21,	639	K.-H. Hiddemann, H. Daniel, O. Schwentker
95Ho03	ZPAAD	350,	277	S. Hofmann, V. Ninov, F.P. Heßberger, P. Armbruster, H. Folger, G. Münzenberg, H.J. Schött, A.G. Popeko, A.V. Yeremin, A.N. Andreyev, S. Saro, R. Janik, M. Leino
95Ho04	ZPAAD	350,	281	S. Hofmann, V. Ninov, F.P. Heßberger, P. Armbruster, H. Folger, G. Münzenberg, H.J. Schött, A.G. Popeko, A.V. Yeremin, A.N. Andreyev, S. Saro, R. Janik, M. Leino
95Ho.3	NUPAB to be pd			D. Hojman, J. Sauvage, F. Ibrahim, P. Kilcher, F. Le Blanc, J. Oms, B. Roussière, J. Libert, ISOCELE
95Ho.A	GSI-Nachr. Feb			S. Hofmann, V. Ninov, F.P. Heßberger, P. Armbruster, H. Folger, G. Münzenberg, H.J. Schött, A.G. Popeko, A.V. Yeremin, A.N. Andreyev, S. Saro, R. Janik, M. Leino
95Ho.B	PrvCom GAu Mar			S. Hofmann, V. Ninov, F.P. Heßberger
95Ho.C	B-Arles PD19			S. Hofmann, F.P. Heßberger, H. Folger, V. Ninov, A.N. Andreyev, D.D. Bogdanov, V.I. Chepigin, A.P. Kabachenko, O.N. Malyshev, A.G. Popeko, G.M. Ter-Akopian, A.V. Yeremin, S. Saro
95Jo02	NUPAB	584,	489	A. Jokinen, T. Enqvist, P.P. Jauho, M. Leino, J.M. Parmonen, H. Penttilä, J. Äystö, K. Eskola
95Ka.A	B-Arles PD22			V.G. Kalinnikov, B.P. Osipenko, F. Pražak, A.A. Solnyshkin, V.I. Stegailov, P. Čaloun, S.E. Zaparov
95Ke05	ZPAAD	352,	1	H. Keller, R. Kirchner, B. Rubio, J.L. Tain, Th. Dörfler, W.-D. Schmidt-Ott, E. Roeckl
95Kr03	PRLTA	74,	860	R.A. Kryger, A. Azhari, M. Hellström, J.H. Kelley, T. Kubo, R. Pfaff, E. Ramakrishnan, B.M. Sherrill, M. Thoennessen, S. Yokoyama, R.J. Charity, J. Dempsey, A. Kirov, N. Robertson, D.G. Sarantites, L.G. Sobotka, J.A. Winger
95Le04	PRVCA	51,	1047	M.J. Leddy, S.J. Freeman, J.L. Durell, A.G. Smith, S.J. Warburton, D.J. Blumenthal, C.N. Davids, C.J. Lister, H.T. Penttilä
95Le15	APOBB	26,	309	M. Leino, J. Äystö, T. Enqvist, A. Jokinen, M. Nurmia, A. Ostrowski, W.H. Trzaska, J. Uusitalo, K. Eskola, P. Armbruster, V. Ninov
95Le.A	P-Arles 505			M. Leino, T. Enqvist, W.H. Trzaska, J. Uusitalo, K. Eskola, P. Armbruster, V. Ninov and PrvCom GAu June 1995
95Le.B	B-Arles A10			A. Lépine-Szily, G. Auger, W. Mittig, M. Chartier, D. Bibet, J.M. Casandjian, M. Chabert, J. Fermé, A. Gillibert, M. Lewitowicz, F. Loyer, M. Mac Cormick, M.H. Moscatello, N.A. Orr, E. Plagnol, C. Ricault, C. Spitaels, A.C.C. Villari and PrvCom GAu June 1995
95Me.1	PHSTB	T56,	272	K.A. Mezilev, Yu.N. Novikov, A.V. Popov, B. Fogelberg, L. Spanier
95Ni05	ZPAAD	351,	125	V. Ninov, F.P. Heßberger, S. Hofmann, H. Folger, A.V. Yeremin, A.G. Popeko, A.N. Andreyev, S. Saro
95No.A	P-Arles 363			T. Nomura
95Og.A	P-Arles 373			Yu. Ts. Oganessian
95Pa.A	P-Arles 583			R.D. Page, P.J. Woods, R.A. Cunningham, T. Davinson, N.J. Davis, A.N. James, K. Livingston, P.J. Sellin, A.C. Shotter
95Ro09	ZPAAD	351,	127	B. Roussière, F. Ibrahim, P. Kilcher, F. Le Blanc, J. Oms, J. Sauvage, A. Wojtasiewicz, ISOCELE
95Se.A	B-Arles A15			K.K. Seth (and oral presentation)
95Sz01	NUPAB	584,	221	J. Szerypo, M. Huyse, G. Reusen, P. Van Duppen, Z. Janas, H. Keller, R. Kirchner, O. Klepper, A. Piechaczek, E. Roeckl, D. Schardt, K. Schmidt, R. Grzywacz M. Pfützner, A. Płochocki, K. Rykaczewski, J.Żylicz, G.D. Alkhazov, L. Batist, A. Bykov, V. Wittmann, B.A. Brown
95To.A	P-Arles 607			K.S. Toth, J.C. Batchelder, L.F. Conticchio, W.B. Walters, C.R. Bingham, J.D. Richards, B.E. Zimmerman, C.N. Davids, H. Penttilä, D.J. Henderson, R. Hermann, A.H. Wuosmaa
95Uu.1	PRVCA to be pd			J. Uusitalo, T. Enqvist, M. Leino, W.H. Trzaska, K. Eskola, P. Armbruster, V. Ninov
95Zh10	NUPAB	586,	483	K. Zhao, J.S. Lilley, P.V. Drumm, D.D. Warner, R.A. Cunningham, J.N. Mo
95Zi.1	PRLTA	75,	1719	M. Zinser, F. Humbert, T. Nilsson, W. Schwab, T. Blaich, M.J.G. Borge, L.V. Chulkov, H. Eickhoff, T.W. Elze, H. Emling, B. Franzke, H. Freiesleben, H. Geissel, K. Grimm, D. Guillemaud-Mueller, P.G. Hansen, R. Holzmann, H. Imich, B. Jonson, J.G. Keller, O. Klepper, H. Klingler, J.V. Kratz, R. Kulessa, D. Lambrecht, Y. Leifels, A. Magel, M. Mohar, A.C. Mueller, G. Münzenberg, F. Nickel, G. Nyman, A. Richter, K. Riisager, C. Scheidenberger, G. Schrieder, B.M. Sherrill, H. Simon, K. Stelzer, J. Stroth, O. Tengblad, W. Trautmann, E. Wajda, E. Zude preprint GSI-95-03

Table IV. Deviating data compared with recommended ones

EXPLANATION OF TABLE

This table is an update to Table B of [I] for some experimental data which are not checked by other experimental method and which are at variance with systematics (see Section 9). The second part gives the resulting mass values if those data were used.

IV-a DEVIATING DATA

Item	Reference[a]	Experimental value		Recommended value	
^{55}Sc−C$_{4.583}$	90Tu01	−30600	1100	−32570	1100
^{57}Ti−C$_{4.75}$	90Tu01	−35700	1000	−37100	1000
^{90}Tc(β^+)^{90}Mo	74Ia01	8900	400	removed	
	81Ox01	8870	300	removed	
^{108}Mo(β^-)^{108}Tc	92Gr.A	5135	60	4750	150
^{108}Mo(β^-)^{108}Tc	95Jo02	5100	60		
^{109}Tc(β^-)^{109}Ru	89Gr23	6315	70	5985	200
^{112}Ru(β^-)^{112}Rh	91Jo11	4520	80	3670	200
^{116}Cs^m(ϵp)^{115}I	78Da07	6450	300	6780	300
^{129}Nd(ϵp)^{128}Ce	78Bo.A	5300	300	6100	200
^{131}Nd(ϵp)^{130}Ce	78Bo.A	4600	400	4270	400
^{138}Nd(β^+)^{138}Pr	61Bo.B	2020	100	1100	200
^{139}Eu(β^+)^{139}Sm	95Gr.A	6080	50	7020	150
^{140}Sm(ϵ)^{140}Pm	87De04	3400	300	removed	
^{142}Tb(β^+)^{142}Gd	91Fi03	10400	700	9900	700
^{145}Dy(β^+)^{145}Tb	93Al03	7300	200	7520	200
^{149}Er(ϵ)^{149}Ho	89Fi01	8610	650	7810	470
^{150}Ho(β^+)^{150}Dy	84Al36	6980	150	7240	100
^{156}Er(β^+)^{156}Ho	82Vy06	1670	70	removed	
^{158}Er(β^+)^{158}Ho	61Bo24	1940	80	removed	
	68Ab18	1860	60	removed	
	82Vy06	1710	40	removed	
^{161}Yb(β^+)^{161}Tm	94Po26	3585	200	4150	200
^{162}Lu(β^+)^{162}Yb	83Ge08	6740	270	removed	
	93Al03	6960	100	removed	
^{172}W(β^+)^{172}Ta	74Ca.A	3250	100	2500	200
^{173}Ta(β^+)^{173}Hf	73Re03	3670	200	2690	200
^{176}Tm(β^-)^{176}Yb	67Gu11	4120	100	removed	
^{184}Au(β^+)^{184}Pt	84Da.A	6450	50	7060	60
^{184}Hg(β^+)^{184}Au	84Da.A	3660	30	4120	60
^{187}Au(β^+)^{187}Pt	83Gn01	3600	40	3730	100
^{188}Au(β^+)^{188}Pt	84Da.A	5520	30	5300	100
^{188}Hg(β^+)^{188}Au	84Da.A	2040	20	2300	150
^{190}Hg(β^+)^{190}Au	74Di.A	2105	80	1470	150
^{204}Au(β^-)^{204}Hg	67Wa23	4500	300	removed	
^{207}Fr−^{213}Fr$_{.324}$ ^{204}Fr$_{.676}$	82Au01	−2540	330	−2140	240

[a] References are listed in Table III.

IV-b RESULTING MASSES

Nuclide	Mass excess from exp. data		Recommended mass excess	
^{35}Mg	17390	1600	16290#	440#
^{53}Sc	−38960	260	−37970#	300#
^{55}Sc	−28500	1020	−30340#	1030#
^{57}Ti	−33250	930	−34560#	930#
^{66}As	−52070	60	−51820#	200#
^{70}Br	−51970#	270#	−51590#	360#
^{71}Se	−63460	130	−63090#	200#
^{79}Zn	−53940	270	−53400#	270#
^{80}Y	−63360	130	−61170#	400#
^{88}Nb	−76070	100	−76420#	200#
^{106}Sb	−66900	170	−66360#	310#
^{108}Mo	−70820	140	−71190#	200#
^{109}Tc	−74540	100	−74870#	210#
^{110}Sb	−76820	90	−77540#	200#
^{110}I	−60890	170	−60350#	310#
^{111}Sb	−81470	50	−80840#	200#
^{112}Ru	−75620	510	−75870#	540#
^{112}Rh	−80140	500	−79540#	500#
^{113}Te	−78760	170	−78310#	200#
^{114}Ru	−70890	540	−70790#	360#
^{114}Rh	−76990	500	−75590#	300#
^{114}Te	−81510	190	−81920#	200#
^{114}Cs	−55110	160	−54570#	310#
^{115}I	−76130#	470#	−76460#	470#
^{115}Xe	−68020	230	−68430#	240#
^{116}Rh	−71960	500	−71060#	500#
^{116}Xe	−73220	250	−72900#	250#
^{117}Ba	−58030	390	−56950#	650#
^{129}Ce	−75750	210	−76300#	210#
^{129}Nd	−62980#	420#	−62170#	360#
^{130}Ce	−79790	610	−79460#	610#
^{138}Nd	−81120	100	−82040#	200#
^{138}Pm	−74120	270	−75040#	320#
^{138}Pm^{m}	−74030	110	−74950#	210#
^{139}Eu	−66300	50	−65360#	150#
^{140}Gd	−62190	400	−61530#	400#
^{140}Tb	−50890	900	−50730#	900#
^{142}Gd	−67150	300	−66850#	300#
^{142}Tb	−56750	760	−56950#	760#
^{142}Dy	−49650	790	−50050#	790#
^{144}Gd	−71360	400	−71920#	200#
^{145}Dy	−58950#	300#	−58730#	300#
^{149}Er	−53300	380	−53860#	470#
^{150}Ho	−62630	80	−62080#	100#
^{150}Er	−58520	80	−57970#	100#
^{151}Tm	−51380#	120#	−50830#	140#
^{151}Tm^{m}	−51330	120	−50780#	130#
^{151}Yb	−42240	310	−41690#	320#
^{154}Tm	−55110	100	−54560#	110#
^{154}Yb	−50630	80	−50080#	100#
^{155}Lu	−43180	120	−42630#	130#
^{155}Lu^{m}	−43160#	120#	−42610#	140#
^{155}Lu^{n}	−41380#	130#	−40830#	140#
^{156}Ho	−66130	400	−65470#	200#
^{158}Lu	−47900	110	−47350#	120#
^{158}Hf	−42800	80	−42250#	100#
^{159}Ta	−35100	110	−34550#	120#
^{159}Ta^{m}	−34990#	120#	−34440#	140#
^{160}Eu	−63840	170	−63370#	200#
^{160}Lu	−50880#	230#	−50280#	230#
^{161}Yb	−58350	180	−57890#	220#
^{161}Lu	−53050	210	−52590#	240#
^{162}Ta	−40470	120	−39920#	130#
^{162}W	−34700	80	−34150#	100#
^{163}Re	−26660	100	−26110#	110#
^{163}Re^{m}	−26490#	120#	−25940#	140#
^{166}Re	−32410	130	−31860#	140#
^{166}Os	−26140	90	−25590#	100#
^{167}Ta	−47840#	410#	−48460#	430#
^{167}Ir	−17740	90	−17190#	100#
^{167}Ir^{m}	−17520#	120#	−16970#	140#
^{170}W	−48000	350	−47240#	470#
^{170}Ir	−23810	140	−23260#	150#
^{170}Pt	−17010	90	−16460#	100#
^{171}Au	−8210#	240#	−7660#	250#
^{171}Au^{m}	−7910#	130#	−7360#	140#
^{172}W	−48220	210	−48980#	270#
^{173}Ta	−51610#	230#	−52590#	230#
^{173}W	−47610#	380#	−48590#	380#
^{174}Re	−44610#	350#	−43680#	410#
^{174}Os	−40700	350	−39940#	470#
^{174}Au	−14600	140	−14050#	150#
^{176}Os	−43070	70	−41960#	200#
^{178}Ir	−37180	280	−36250#	360#
^{178}Pt	−32700	350	−31940#	470#
^{178}Tl	−5000#	210#	−4450#	210#

Nuclide	Mass excess from exp. data		Recommended mass excess	
^{180}Os	−44420	40	−44390#	180#
^{180}Ir	−38610	70	−37960#	190#
^{180}Pt	−35370	70	−34270#	200#
^{182}Au	−29230	280	−28300#	360#
^{182}Hg	−24280	350	−23520#	470#
^{184}Pt	−37400	40	−37360#	180#
^{184}Au	−30950	70	−30300#	190#
^{184}Hg	−27290	70	−26180#	200#
^{186}Tl	−20910	290	−19980#	370#
^{186}Tl^m	−20810#	290#	−19880#	370#
^{186}Tl^n	−20440#	290#	−19510#	370#
^{186}Pb	−15380	350	−14620#	470#
^{187}Pt	−36610#	160#	−36740#	180#
^{188}Au	−32300	30	−32520#	100#
^{188}Hg	−30260	40	−30220#	180#
^{188}Pb	−18750	70	−17640#	200#
^{189}Au	−33320	300	−33640#	200#
^{189}Hg	−29120	360	−29690#	280#
^{189}Tl	−23950	410	−24510#	350#
^{189}Tl^m	−23660	410	−24230#	350#
^{190}Hg	−30780	80	−31410#	150#
^{190}Tl	−23780	410	−24410#	430#
^{190}Tl^m	−23610	310	−24240#	340#
^{190}Bi	−11630	290	−10700#	370#
^{190}Bi^m	−11420#	290#	−10490#	370#
^{190}Po	−5320	350	−4560#	470#
^{191}Tl	−25840	220	−26190#	220#
^{191}Tl^m	−25540	220	−25890#	220#
^{192}Hg	−31740	1250	−32070#	280#
^{192}Tl	−25360	1230	−25950#	200#
^{192}Tl^p	−25160	1230	−25750#	210#
^{192}Pb	−22620	40	−22580#	180#
^{192}Po	−9010	70	−7900#	200#
^{193}Bi	−15220	410	−15780#	350#
^{193}Bi^m	−14910	410	−15470#	350#
^{194}Pb	−23620	80	−24250#	150#
^{194}Bi	−15430	410	−16070#	430#
^{194}Bi^n	−15170	310	−15800#	340#
^{194}At	−1890#	330#	−960#	400#
^{194}At^m	−1640#	290#	−710#	370#
^{195}Pb	−22430	590	−23780#	410#
^{195}Pb^m	−22230	590	−23580#	410#
^{195}Bi	−17580	220	−17930#	220#
^{195}Bi^m	−17180	220	−17530#	220#
^{196}Bi	−17480	1230	−18060#	210#
^{196}Bi^m	−17310	1230	−17900#	210#
^{196}Bi^n	−17210	1230	−17790#	210#
^{196}Po	−13540	40	−13500#	180#
^{196}Rn	1040	80	2150#	200#
^{197}At	−5690	420	−6250#	350#
^{197}At^m	−5640	420	−6200#	350#
^{198}Po	−14880	80	−15520#	150#
^{198}At	−6120	410	−6750#	430#
^{198}At^m	−5750	310	−6380#	340#
^{199}Po	−13930	590	−15280#	410#
^{199}Po^m	−13620	590	−14970#	410#
^{199}At	−8380	220	−8730#	220#
^{200}At	−8460	1230	−9040#	210#
^{200}At^m	−8340	1230	−8930#	210#
^{200}At^n	−8110	1230	−8700#	210#
^{200}Rn	−4070	40	−4030#	180#
^{201}Fr	4270	420	3710#	350#
^{202}Rn	−5680	80	−6320#	150#
^{202}Fr	3700	410	3060#	430#
^{202}Fr^m	4060	310	3430#	340#
^{203}Rn	−4880	590	−6230#	410#
^{203}Rn^m	−4510	590	−5860#	410#
^{203}Fr	1330	230	980#	230#
^{204}Fr	1140	1230	550#	210#
^{204}Fr^m	1190	1230	610#	210#
^{204}Fr^n	1470	1230	880#	210#
^{204}Ra	5990	40	6030#	180#
^{206}Ra	4160	80	3520#	150#
^{207}Ra	4820	590	3470#	420#
^{207}Ra^m	5380	590	4030#	410#
^{207}Ac	11620	230	11270#	230#
^{208}Ac	11280	1230	10700#	210#
^{208}Ac^m	11790	1230	11210#	210#
^{210}Th	14640	90	14000#	150#
^{211}Th	15190	600	13840#	420#
^{228}Fr	32390	1640	33280#	200#