Erratum: α decay of even-even superheavy elements [Phys. Rev. C 81, 034613 (2010)]

V. Yu. Denisov and A. A. Khudenko

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We have found an error in our code for Q-value calculations that appeared in the programming of the last summand of the following equation (see also Eq. (7) in the original article and Refs. [1,2]):

$$Q_{\text{g.s.}\to\text{g.s.}} = \Delta M_p - (\Delta M_d + \Delta M_\alpha) + k\left(Z_p^\epsilon - Z_d^\epsilon\right). \quad (1)$$

Here ΔM_p, ΔM_d, and ΔM_α are the atomic mass excess of the parent, daughter and α nuclei, respectively; Z_p and Z_d are the number of protons in the parent and daughter nuclei, respectively; and k and ϵ are the coefficients. We consider that α decay is mainly a nuclear process and that the electronic shell processes are started after an emission of α particles from the nucleus. Therefore the variation of bound energy of electrons in parent and daughter atoms at α decay described by the last term in Eq. (1) should be taken into account during Q-value evaluation.

We used the experimental Q values and took into account the variation of bound energy of electrons in parent and daughter atoms at α decay in Table I of the original article. Therefore, the Q values presented in Table I of the original article differ from the corrected ones. The absolute differences of Q values are less than 4–4.8 keV and the relative errors of the Q values are less than 0.05%. The new values of the half-lives evaluated with the corrected Q values deviate from those presented in Table I slightly. The relative errors of the half-life values are in the range 0.4%–3.5% as a rule.

The Q values presented in Table II are correct, because another code was used for the Q-value evaluation. That is why the last two columns of this Table give the correct values of the half-lives. Because we have found new parameters for the empirical relations [1] we can evaluate the relative errors of previous results: the relative differences of the calculated half-life values in the framework of the empirical relations with parameters for the total range and the heavy range of nuclei are, respectively, 0%–4.1% and 4.3%–7.9%. Note that we use the parameters of the UMADAC model presented in Ref. [3]. However we plan to reevaluate the values of these parameters soon.

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[1] V. Yu. Denisov and A. A. Khudenko, Phys. Rev. C **79**, 054614 (2009).

[2] V. Yu Denisov and A. A. Khudenko, Phys. Rev. C **80**, 034603 (2009).

[3] V. Yu. Denisov and A. A. Khudenko, At. Data Nucl. Data Tables **95**, 815 (2009).

