Erratum: α-decay half-lives: Empirical relations [Phys. Rev. C 79, 054614 (2009)]

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We have found an error in our code related to the evaluation of the Q-value correction induced by atomic bound electrons (the electron screening effect); see Eq. (2) of the original article. Typical magnitudes of α-transition Q values are several MeVs and the differences between earlier calculated Q values and the correct ones are less than 5 keV. However, these differences lead to variations in the values of the parameters of the empirical relations for α-decay half-lives. Therefore, we make a new search of the parameters for the empirical expressions. The empirical relations for α-decay half-lives presented in the original article can be written as

$$\log_{10}(T_{1/2}) = a + b\frac{A^{1/6}Z^{1/2}}{\mu} + \frac{cZ}{\sqrt{Q}} + \frac{d\sqrt{\ell(\ell+1)}}{QA^{-1/6}} + e[(-1)^{\ell} - 1].$$

The new values of parameters a, b, c, d, and e are given in Table I.

The electron screening effect affects the values of the root-mean-square (RMS) errors presented in Tables I, II, and III of the original article. The new quantities are presented in Table II, which unifies Tables I, II, and III of the original article. Note that the RMS errors found in the framework of the UMADAC model [21] are evaluated at the original values of the parameters. The reevaluation of the parameters of the UMADAC model will done later.

TABLE I. The parameters of the empirical relations found for even-even (e-e), even-odd (e-o), odd-even (o-e), and odd-odd (o-o) ranges of nuclei.

	a	b	c	d	e
			Total range of nuclei		
e-e	−26.1721	−1.1549	1.6088		
e-o	−30.2365	−1.0726	1.6910	0.7198	−0.6965
o-e	−30.0842	−1.0853	1.6925	0.2453	−0.6406
o-o	−30.8222	−0.9874	1.6577	0.5893	−0.2914
			Range of light nuclei		
e-e	−29.2462	−1.0372	1.6317		
e-o	−29.3796	−1.0807	1.6700	0.8009	−0.7403
o-e	−28.4185	−1.1143	1.6614	0.2246	−0.7244
o-o	−32.0319	−1.0415	1.7326	0.3596	0.0903
			Range of heavy nuclei		
e-e	−28.0218	−1.0490	1.5858		
e-o	−35.0831	−0.8378	1.6721	0.6687	−0.6695
o-e	−33.8303	−0.9461	1.7047	0.4372	−0.5095
o-o	−40.9482	−0.3717	1.5229	1.4082	−0.0127

TABLE II. The RMS errors of the decimal logarithm of the α-decay half-lives calculated for the various data sets. The last column contains the references for corresponding approaches; see the original article for details.

Total	e-e	e-o	o-e	o-o	
			Total range of nuclei		
0.5488	0.3308	0.6177	0.6772	0.6916	SET I
0.6248	0.3060	0.7830	0.7623	0.7552	[21]
1.0146	0.4225	1.3585	1.2624	1.0940	[9]
1.0245	0.5205	1.1661	1.3453	1.2617	[11]
1.1209	0.3922	1.4850	1.3783	1.3426	[7]
1.1344	0.3652	1.5510	1.3635	1.3390	[10]
1.3926	1.3067	1.4389	1.5728	1.2828	[6]
			Range of light nuclei		
0.4955	0.2674	0.5767	0.5834	0.6653	SET II
0.5338	0.3739	0.5806	0.5941	0.7132	SET I
0.5487	0.3054	0.6560	0.6146	0.7389	[21]
0.7750	0.3731	0.8440	1.0658	0.9606	[10]
0.7791	0.4454	0.8525	0.9543	1.0512	[9]
0.8114	0.4843	0.8408	1.1144	0.9635	[7]
0.8184	0.6046	0.6957	1.2076	0.8613	[11]
1.4955	1.7221	1.1570	1.6586	1.1735	[6]
			Range of heavy nuclei		
0.5291	0.1907	0.6610	0.7590	0.5388	SET III
0.5710	0.2675	0.6804	0.7770	0.6743	SET I
0.7193	0.3093	0.9579	0.9230	0.8033	[21]
1.2408	0.2970	1.8106	1.4845	1.4833	[6]
1.2591	0.3894	1.6645	1.5171	1.7708	[11]
1.2607	0.2686	1.9108	1.5780	1.1897	[9]
1.3500	0.3188	2.0332	1.6298	1.4300	[12]
1.4484	0.2250	2.1482	1.6657	1.8440	[7]
1.5002	0.3579	2.2642	1.6775	1.8392	[10]
1.7017	0.2271	2.5168	1.9323	2.2389	[8]

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