Is the Abundance of Elements in Earth's Crust Correlated with LENR Transmutation Rates?

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In our previous investigation [1], we found that (i) three different transmutation data sets [2-4] from low-energy nuclear reaction (LENR) experiments exhibit the same pattern in the production rates as a function of atomic mass number (A), and that (ii) the patterns are significantly statistically correlated with the neutron scattering strength as a function of A, according to a Widom-Larsen (WL) theory [5]. The aim of the present study was to investigate whether the same pattern is also present in the distribution of abundances of elements in the Earths' crust [6]. We analyzed whether the abundance of elements in the Earths' crust is correlated with the neutron scattering strength as a function of atomic number (Z), the $f(Z)$ function, according to the WL prediction. We found that (i) the $f(Z)$ function is not statistically significantly ($p > 0.05$) correlated with the elemental abundance data (see Fig1(a)), and that (ii) $f(Z)$ function does not predict the peaks found in the abundances of elements in Earth's crust ($p > 0.01$, Bonferroni-corrected) (see Fig2(b)). Thus, there is no statistically significant relationship between the $f(Z)$ function and the abundance of elements in Earth's crust. This strengthens the interpretation that the observed patterns in the measured transmutation data sets are artifacts due to impurities in the experiments.

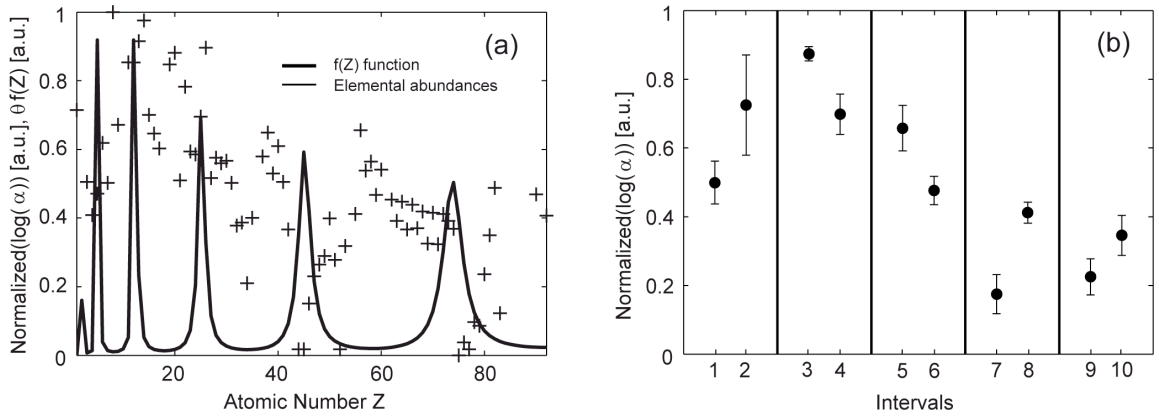

Fig 1: (a) Shown is the comparison between the abundances of elements in Earth's crust (α) and the predicted $f(Z)$ function based on the WL theory. θ: scaling coefficient ($\theta = 0.5102$, estimated using least squares fitting). (b) Interval-wise comparison between the abundance data and the WL prediction. Interval definition: (i) intervals with maxima: (1): 4-6, (3): 12-13, (5): 23-27, (7): 42-48, (9): 69-79; (ii) intervals with minima: (2) 7-9, (4) 15-21, (6) 29-39, (8) 50-70, (10) 80-92. The interval boundaries are defined according to the $f(Z)$ function. Data given in mean ± standard deviation.

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