LETTERS TO PROGRESS IN PHYSICS

Atomic Masses of the Synthesed Elements (No.104–118) being Compared to Albert Khazan's Data

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Herein, the Hyperbolic Law of the Periodic System of Elements is verified by new data provided by theory and experiments.

A well-known dependence exist in the Periodic Table of Elements. This dependence links atomic masses of chemical elements with their numbers in the Table. Our research studies [1, 2] produced in the recent years showed that this dependence continues onto also the region of the synthetic elements located, in the Table, from Period 7 upto the end of Period 8. As is seen in Fig. 1, our calculations can be described by an equation whose coefficient of truth approximation is $R^2 = 0.99995$. However the experimental data obtained by the nuclear physicists, who synthesed the super-heavy elements, manifest a large scattering which gives no chance to get a clear dependence in this region. This is because their experiments were produced in the hard conditions, and only single atoms were synthesed that makes no possibilities for any statistics. Despite this drawback, the nuclear physicists continue attempts to synthese more and more super-heavy elements, still giving their characteristics to be unclear exposed. At the present day, 15 super-heavy elements (No.104–118) were synthesed. Obtained portions of them are as microscopic as the single atoms [3]. Therefore, masses of the products of the reactions are estimated on the basis of calculations. Analysis of the calculated data being compared to the data obtained on the basis of our theory is given in Fig. 2. The upper arc shows the difference between the atomic masses obtained on the basis of the experimental data (which are unclear due to the large scattering) and our exact calculations. All given in the Atomic Units of Mass (A.U.M.).

In the upper arc of Fig. 2, these numerical values are converted into percents. As is seen, this arc has a more smooth shape, while there is absolutely not deviations for elements No. 105 and No. 106. Most of the deviations is less than 2%. Only 5 points reach 2.5–3.6%. Proceeding from these results, we arrive at the following conclusion. Because our calculation was true on the previous numerical values, it should be true in the present case as well. Hence, the problem rises due to the complicate techniques of the experiments, not doubts in our theory which was checked to be true along all elements of the Periodic Table. It is important to note that our theoretical prediction of element No.155 [1, 2], heavier of whom no other elements can be formed, arrived after this.

Concerning the experimental checking of our theory. There are super-heavy elements which were synthesed already later as my first research conclusions were published in 2007 [1]. These new elements — their characteristics obtained experimentally (even if with large scattering of the numerical values) — can be considered as the experimental verification of the theory I suggested [1, 2], including the Hyperbolic Law in the Periodic Table of Elements, and the upper limit of the Table in element No.155.

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References

1. Khazan A. Upper Limit in the Periodic Table of Elements. Progress in Physics, 2007, v. 1, 38–41.
2. Khazan A. Upper Limit in Mendeleev's Periodic Table — Element No. 155. American Research press, Rehoboth (NM), 2012.
3. Web Elements: the Periodic Table on http://webelements.com

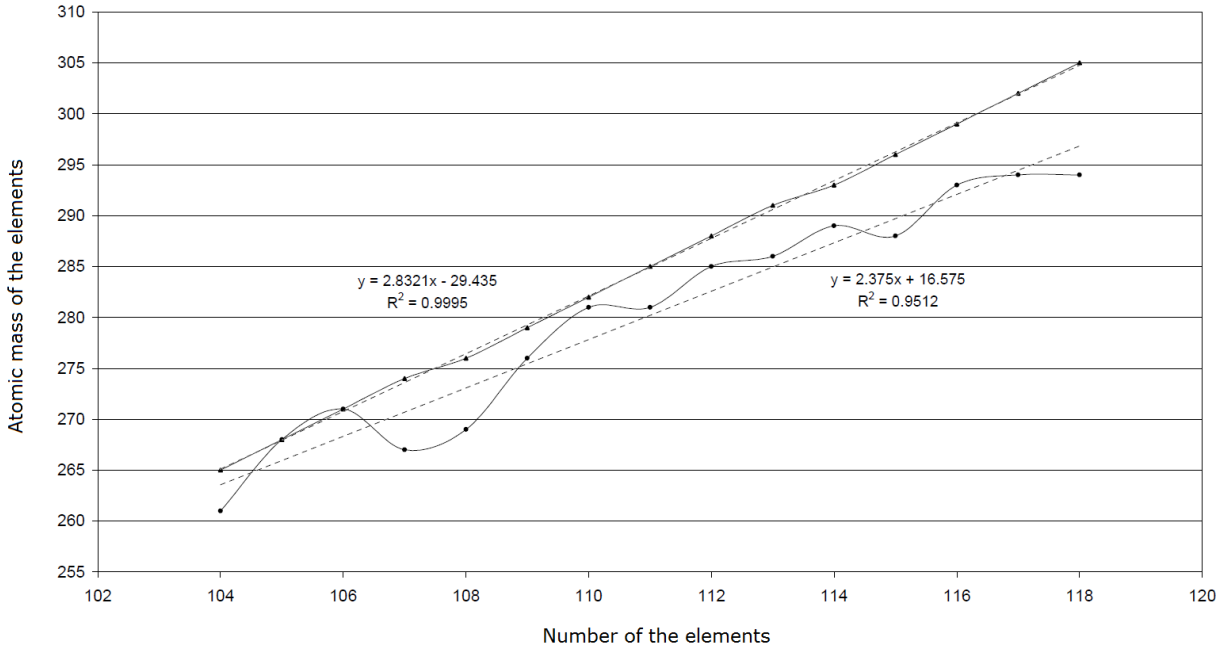

Fig. 1: Dependence of the atomic masses of the elements on their number in the Periodic Table. The experimental data (obtained with large scattering of the numerical values) are shown as the curved arc. Our calculations are presented with the straight line.

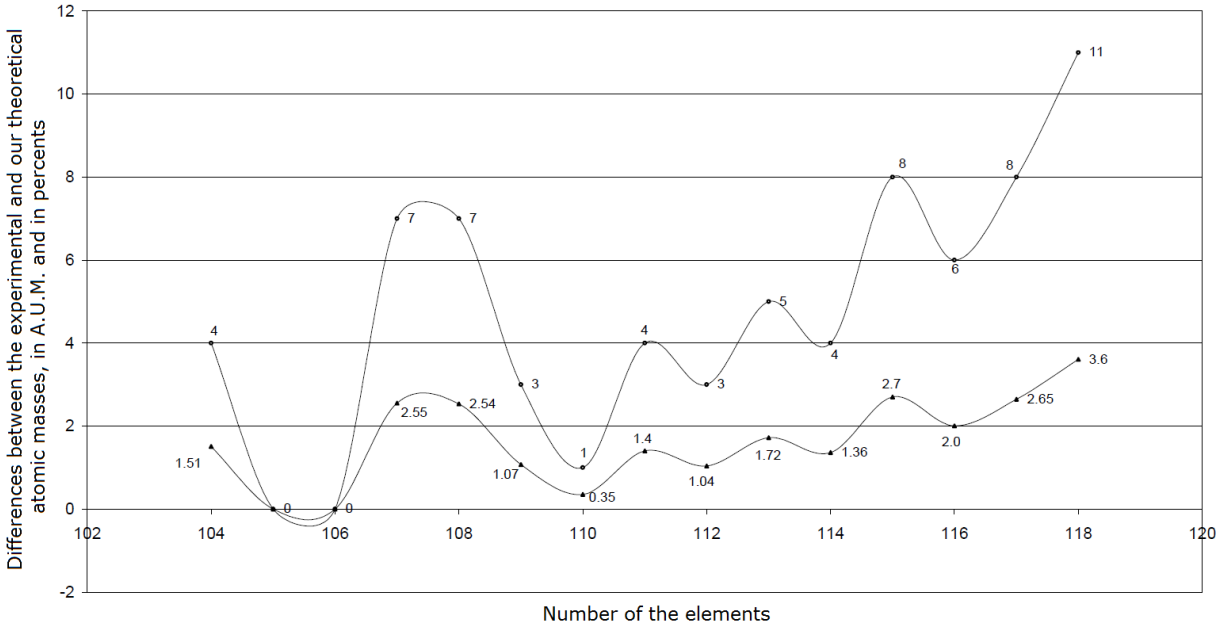

Fig. 2: Differences between the atomic masses (experimental and our theoretical), obtained in the region of the super-heavy (synthetic) elements No.104–No.188. The upper arc manifests the differences in A.U.M. (g/mole). The lower arc — the same presented in percents.