Ionization potentials of multicharged ions of iron group elements [[1]](#footnote-1)\*)

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The available data [1] on the ionization potentials (energies)  (eV) of the ions with the number of electrons  of the elements with atomic numbers *Z* = 21, 25, 28 are considered. The ion energies are analyzed by the quasi-classical method [2] of isolating the dependence on the atomic number using the function:

 (1)

In Fig.1, these data are represented in semi-logarithmic scale by symbols, and the lines correspond to linear polynomial approximation () for *K* and *L* shells, and to quadratic one for *M* shell (  ): . Thus, it is possible to restore the ionization potentials of the remaining elements of the iron group according to the formula. However, in practice, information about the ionization potentials of ions of one element, depending on the number of electrons *Ne* in it, is more in demand. Fig.2 demonstrates the dependence of the coefficients  on *Ne* in the *M* shell. Approximation of fragments of the monotone dependences ,  and similar dependences for *K* and *L* shells allows an analytical description of the ionization energies of 144 ions with an error of the order of one percent based on a small table of coefficients .

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| Fig1 | Fig2 |
| Fig.1 | Fig.2 |

References

1. Kramida, A., Ralchenko, Yu., Reader, J., and NIST ASD Team (2021). NIST Atomic Spectra Database (ver. 5.9), [Online]. Available: https://physics.nist.gov/asd [2021, November 6].
2. Shpatakovskaya G.V., Phys. Usp. 62, 186 (2019)

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLIX/Lt/ru/EB-Shpatakovskaya.docx) [↑](#footnote-ref-1)