This second edition of the handbook incorporates data for the whole periodic table up to the element copernicium. That is while the first edition contained 53 elements in the periodic table, this volume presents data up to \( Z = 112 \). There are major additions to the material contained in the first edition. First, results are given for the equation of state of the elements together with the parameters of a Birch fit so that the user can regenerate the results and also derive other information such as pressure-volume relations and the variation of the bulk modulus with pressure. For each element in addition to the equation of state, the energy bands, the densities of states and a set of tight-binding parameters is given. For most elements, the tight-binding parameters are presented for both a two-center and a three-center approximation. For the hcp structure new three-center tight-binding results are given. Other new materials included in this book are the energy bands and densities of states of all the rare earth metals, a discussion of the McMillan-Gaspari-Gyorffy theories and a tabulation of the electron-ion interaction matrix elements. The evaluation of the Stoner criterion for ferromagnetism is discussed and results are tabulated. This edition also contains two new appendices discussing the effects of spin-orbit interaction and a modified version of Harrison’s tight-binding theory for metals which puts the theory on a quantitative basis.

The author believes that the accumulation of these results together in one source and their generation by the same methodology will be very useful for researchers and students to be able to quickly obtain the basic information of the electronic structure of all the elements in the periodic table.

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