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**MAIN ELEMENTS
of the
EARTH'S CRUST**

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AL-FARABI KAZAKH NATIONAL UNIVERSITY

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MAIN ELEMENTS OF THE EARTH'S CRUST

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The monograph presents theoretical material on the basic physical and chemical properties of the main elements of the Earth's crust, their methods of production and the most important fields of application.

In addition to the basic information about these elements, the monograph contains information on the history of discovery, on the speciation in the environment, minerals, isotopes and the biological role of elements.

The monograph is primarily for students and teachers as an excellent addition to the traditional textbooks on chemistry and chemical ecology. Additionally it can be recommended to a wide range of chemists, ecologists, engineers and technicians as a means of preliminary review with each of the elements considered.

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Abbreviations

- CD – cluster decay
- d – days
- EC – electron capture
- IT – isomeric transition
- min – minutes
- ms – microseconds
- ns – nanoseconds
- s – seconds
- y – years
- BC – before Christ
- n.c. – normal conditions
- dil. – diluted
- liq – liquid
- g – gas
- ct – catalyst
- conc. – concentrated
- satur. – saturated
- P – pressure

Preface

This monograph contains summarized data on the most abundant elements of the Earth's crust. The described 18 elements constitute 99.8% of the whole Earth's crust. The Earth's crust gives us not only the place for living but also the main necessary conditions for living on this Planet. It consists of the main minerals, which we apply in industry and science. It gives conditions for plants and animals to live, so, hence, it gives us food. The Earth's crust gave the basis for a human appearance on the Earth, assist us to have now, and will be a basis for our future generations. The deep knowledge of the main construction material of our planet is essential; and the information presented in this monograph will assist to understand all processes occurring on our Planet, resulting in future innovations. The monograph allows to penetrate the depths of history and to get to know, how human familiarized with the main elements of the Earth's crust. The main physical and chemical properties allow to understand the behaviour of the element in the environment and to study cycles of this element in nature. The industrial and laboratory methods of production are also presented in this monograph after a detailed description of minerals, containing this element. Different isotopes of the element are described here, as some of the isotopes became very important in modern science and knowledge of their composition is necessary for a well-educated modern person. The detailed table data on thermodynamical and physicochemical data will be a basis for calculations of prediction properties of these elements. The significance of the element in modern life is described in chapter applications and the biological role with the food, containing this element sum up the information described in the previous chapters.

We hope that this monograph will be useful for students and staff of universities, schoolchildren, chemists, engineers, ecologists, biologists and anyone, who would like to live in Peace with our Planet.