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Organoelement chemistry: a strategic tool for science and technology development

Organoelement chemistry is one of the most significant and vigorously developing fields of modern chemical science. It is important to mention that out of the Nobel Prizes in chemistry awarded in the 21st century, four Prizes were related to this demanding field of science. Organoelement compounds play the predominant role in chemical catalysis, which forms the basis of fine organic synthesis, and is also essential for hydrocarbon processing, which is the cornerstone of the fuel and energy system.

Historically, achievements of Russian scientists in organoelement chemistry have occupied a prominent place on the global science stage. This is the field of science in which our scientists were able not only to retain, but also to enhance their position in the world, despite the crisis of the 1990s. The advances in organoelement chemistry boost the progress of some priority areas of science and technology development strategy of the country, in particular, development of novel materials, transition to environmentally benign and resource-saving power engineering, formation of new energy sources and energy transportation and storage techniques, transition to technology intensive health service and health protection technologies, in particular, rational use of medications, and quite a few other applications. Further progress in this very important area of science may provide grounds for switching from the economy based on extensive exploitation of raw material resources, which has formed in the past decades, to the economy based on highly intellectual, environmentally benign manufacturing processes that would rely on renewable raw materials and be competitive and demanded in the world.

It is beyond all doubt that the development of organoelement chemistry is a key tool for overcoming the most important challenges in science and technology, in particular, those related to new manufacturing processes, to increased anthropogenic load on the environment and new medicinal challenges.

This issue of the journal presents a review of the Russian leading specialists in organoelement compounds. The work of the authors, who represent 10 scientific institutes and universities, is set forth in 11 Sections of the review. The presented survey of fundamental research and practical results does not aim at covering all elements of the Periodic Table and does not claim to be a detailed description of all possible lines of research in organoelement chemistry. The review describes some areas of organoelement chemistry that are largely developed by the authors and that may become the promising growth areas in solving the strategic tasks of science and technology.

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