PREFACE

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This issue of the *Geology of Ore Deposits* is dedicated to the formation of rare-metal mineralization in magmatic systems. The interest in rare elements and metals is not accidental and, to a certain degree, is caused by their use in high technologies and new thriving branches of industry that have developed since the mid-20th century. Such elements as Li, Be, Sc, Zr, Nb, Ta, REE, Sr, etc. have become high-tech materials. Their use has given rise to the creation of diminutive and high-capacity batteries (Li), superconductors (Nb), high-capacity condensers, light (Be, Sc) and heat-resistant (Nb, Re, Hf) alloys, powerful permanent magnets (Nd, Sm), semiconductors (Ga, In), and other commodities. Recent research has discovered new properties of rare metals and new fields for their practical application. Therefore, rare elements are rightly considered an important resource of the high-tech sector of the world economy: they ensure the technological independence and national security of any highly developed country. World mining and consumption of rare elements are growing in line with innovative processes. Russia, however, lags in this respect behind the United States and China, which are leading producers. The necessity of strengthening and developing domestic mineral resources of these strategic metals requires not only reappraisal of already known rare-metal deposits, but also the discovery of new ore objects. Recently developed scientific theories and forecasting methods based on new concepts and providing insights into the formation and localization of mineral deposits, as well as current knowledge on minerals, should be used to strengthen national rare-metal mineral resources.

Some of such approaches are discussed in the papers of this issue, which are concerned with rare-metal magmatic deposits of Siberia and its fold frame-

work. The deposits under consideration are rather peculiar. The links of mineralization to igneous rocks and behavior of ore elements in magmatic processes are of special importance. Therefore, these papers focus on igneous rocks, their geochemistry, and chemical relationships between elements in the course of magmatic fractionation. The results of these studies are important to comprehend ore formation and rare-metal magmatism as an object of metallogenic analysis and forecasting. Evidence is given for close relationships of rare-metal mineralization to certain types of magmatic activity, e.g., alkaline basic rocks with carbonatites or alkali granites characterized not only by specific composition but also by advanced fractionation of the initial melts. The data obtained determine the conditions under which magma fractionation results in ore concentrations; genetic models of ore deposits are discussed. Parameters of isotopic compositions of ore mineralization sources have been estimated. The ages of deposits have been determined in order to specify their belonging to certain rare-metal metallogenic epochs and provinces. Geodynamic regimes of rare-metal magmatism manifestations have been ascertained, and the contribution from mantle plumes to its development has been emphasized.

The employed approaches and the results obtained characterize the current trends in the study of rare-metal magmatic systems and will obviously facilitate in-depth comprehension of rare-metal mineralization. We believe that the published papers will be of interest to specialists in magmatic deposits and rare-metal mineralization.

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