

**REVIEW**  
**on the Book of Olga Voskresenskaya**  
*Kinetic and Thermodynamic Stability of Cerium(IV) Complexes with a  
Series of Aliphatic Organic Compounds*

Investigating the thermodynamics of formation and the kinetics of redox decomposition of complexes arising in the first stage of oxidizing the organic compounds by variable-valence metal ions is of interest from both kinetic and thermodynamic point of view. It is rather important due to the numerous applications of cerium(IV) in various domains of chemistry as a one-electron oxidizer, a complex-forming agent, and a catalyst for numerous reactions.

From the kinetic viewpoint, investigation of the initial steps of these processes is of interest for the following reason, among others: In numerous kinetic studies, the formation of such intermediate complexes has been either merely postulated or studied using methods that provide only the effective formation constants that correspond to a fixed pH value and to an uncertain form of the organic compound and the metal in the complex. At the same time, the kinetic dependences themselves were interpreted on the basis of assumptions about the composition and structure of these complexes; and their reactivity characterized by the values of effective rate constants and activation energies. Thermodynamic study of these complexes is complicated by the redox process that occurs in cerium(IV)-organic compound systems and high hydrolyzability of this cation. It is for this reason that the literature offers little information concerning the stability of cerium(IV) complexes.

In this regard, are essential some kinetic generalizations of the thermodynamic methods to studying the complex formation and also their kinetic analogs, presented in this book, that provide, on the one hand, the possibility of directly determining the composition of relatively stable intermediate complexes formed in the systems, the form in which organic compounds are present in them, and the thermodynamic stability of the complexes. On the other hand, they allow us to study reactivity of these complexes, the kinetics and intermediate mechanism of the redox process occurring in the systems. In the presented book, these methods are applied to determining the stability constants and intramolecular redox-decomposition rate constants of cerium(IV) complexes with a series of aliphatic organic compounds, establishing a correlation between these logarithmic thermodynamic and kinetic parameters and also to creating the quantitative model for the redox process observed in the systems on the basis of obtained parameters and the set of all equations describing the rapid pre-equilibria and way out of these pre-equilibria in the investigated systems.

This book is of undoubted scientific and methodological interest. The principal audience for the book are researchers in the field of coordination and physical chemistry, university faculty, undergraduate and graduate students.

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