Journal of the Serbian Chemical Society
JSCS-info@shd.org.rs • www.shd.org.rs/JSCS
J. Serb. Chem. Soc. 76 (9) 1337–1338 (2011)
JSCS–4207
UDC 537.363+539.196:532+536.7
Book review

BOOK REVIEW

Interfacial electrovicoelasticity and electrophoresis

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Published by CRC Press Taylor & Francis Group, 6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

In contemporary hydrodynamic, electrodynamic and thermodynamic instabilities that occur at interfaces, it is important wisdom to believe that interfacial electroviscoelasticity and electrophoresis are a new science with adequate use in modern technology. They are connected with the interfaces of rigid and deformable particles in homo- and hetero-aggregate dispersed systems, such as emulsions, dispersoides, suspensions, nanopowders, foams, fluosols, polymer membranes, biocolloids and plasmas.

This book is published on 176 pages with 57 Figures, 5 Tables and 232 References, 147 for the first 5 Chapters and 85 for the 6th. The book also has an Author Index and a Subject Index.

The authors have collected six chapters that show the development of the theory of electroviscoelasticity and electrophoresis and the motivation for developing this theory. These chapters cover a wide range including: Classifications of Finely Dispersed Systems, Historical Review and Motivation, Theory of Electroviscoelasticity, Measurements, Implications and Electrophoresis.

Classifications (Chapter 1) are based on various phenomenological notions: the scales, geometry, and the origin of forces, physical-chemical processes and entities.

Historical Review and Motivation (Chapter 2) describe the pilot plant of uranium extraction from wet phosphoric acid. There are also subsections related to entrainment problems in solvent extraction, underlining the performance of demulsions, Marangoni instabilities and possible electrical analogies, and various constitutive models of liquids. Finally, authors introduced the terms “electroviscosity” and “electroviscoelasticity” of liquid–liquid interfaces.

Theory of electroviscoelasticity (Chapter 3) includes: previous work, structure: electrified interfaces – a new constitutive model of liquids and dynamics: physical formalism. Mathematical formalisms are also presented by the stretching tensor model and the van der Pol derivative model: the fractional approach.

Experiments (Chapter 4) confirm the theoretical predictions describing systems which include the generation of the physical model, measuring changes of electrical interfacial potential at interfaces and measuring the characteristic frequencies of the system. The results and discussion of the subsections and assembled measured, calculated and estimated data are given.

The implication and applications to the first and second philosophical breakpoints (Chapter 5) are discussed (particular entrainment problem is solvent extraction: breaking of emulsions).

Electrophoresis (Chapter 6), as very important electrokinetic phenomena, presents analytical tools for the characterization of the surface properties of colloid-sized particles as well as for separation and purification process in both laboratory and industrial investigations.

This welcome collection concerning electroviscoelasticity and electrophoresis provides an important survey of how and where interfacial and colloidal phenomena serve to advance the frontiers of numerous chemical manufacturing processes at the micro-, nano- and atto-scales, in one word to solve problems in solvent extraction operations and processes, colloid and interface science, chemical and biological sensors, electroanalytical methods and /or biology/biomedicine (hematology, genetics and electroneurophysiology). In addition, the second philosophical breakpoint could be applied in elucidation and research of spintronics, decoherence sensitivity, quantum particles entanglement, ionics, fractional-quantum Hall Effect, fluids, *etc*.

This book is aimed not only at those working in a specific area related to the considered phenomena, but also at general chemists, prospective researchers and graduate students with a basic knowledge of physical chemistry, electromagnetism, fluid mechanics, quantum mechanics and wave mechanics.

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