

Preface

Nearly one decade ago a two volume edition on “Polyelectrolytes with Defined Molecular Architecture” edited by M. Schmidt appeared in the *Advances in Polymer Science*, which summarized progress in the field at that date. Within the total 11 chapters one was dedicated to “Polyelectrolyte Complexes,” in which its authors addressed interpolyelectrolyte and polyelectrolyte/surfactant complexes as well as theoretical aspects of polyelectrolyte (PEL) complexation.

This new two-volume edition on “Polyelectrolyte Complexes in the Dispersed and Solid State: Principles and Applications” is intended to extend the content of this former chapter by bringing together selected state of the art contributions on principles and theory (Volume I) as well as on actual application aspects (Volume II) of polyelectrolyte complex (PEC) based particles and soft matter. In the Volume I progress and new knowledge on theoretical aspects of electrosorption phenomena between PEL and oppositely charged surfaces (A.G. Cherstvy and R.G. Winkler) and of the practically always apparent aggregation and clustering tendency of PEC particles (N.I. Lebovka) are reviewed. Recently identified important dynamic aspects of ion conductivity (C. Cramer and M. Schönhoff) within PEC soft matter and relaxation phenomena within PEL/protein PEC particles (S. Lindhoud and M.A. Cohen-Stuart) as well as structural aspects of interpolyelectrolyte complexes of novel synthetic polyionic species with nonlinear topology and polymer–inorganic hybrids (D.V. Pergushov, A.A. Zezin, A.B. Zezin, A.H.E. Müller) are reviewed. In Volume II, prominent recent applications of PEC particles are reviewed together with an outline of relevant key properties concerning colloidal stability, size, shape, compactness, surface, and biointeraction. The use and tailoring of PEC particle-modified relevant surfaces for paper making (C. Ankerfors and L. Wagberg), solid–liquid separation and water treatment (G. Petzold and S. Schwarz) are addressed. The last three contributions review PEC applications in the life sciences, including the role of PEL/protein complex assemblies in food

(S. Bouhallab and T. Croguennec), the use of DNA/polycation complexes for gene delivery and protection (A. Bertin), and the potential of sizable and shapable nanosized PEC particles in pharmaceutical applications such as controlled drug release (M. Müller).

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State II

Application Aspects

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