

Book reviews

Emulsions and Emulsion Stability (Surfactant Science Series Vol. 61)

J. Sjöblom (Editor), Marcel Dekker, New York, 1996. 474 pages; US\$165.00. ISBN 0-8247-9689-6

The intention of this book is described as ‘...to give a fundamental presentation of emulsion science’. This includes essential theories as well as information about practical emulsification techniques and analytical methodology. The book collects this information in 10 chapters written by renowned experts in their field.

The first chapter by Friberg and Yang discusses the mechanisms involved in the stability of emulsions. This includes wetting and spreading conditions, processes in thin films, flocculation/coalescence kinetics, polymeric stabilizers and third-phase stabilization. In addition, the authors describe the behaviour of emulsions during evaporation processes. ‘Kinetics of Brownian and Gravitational Coagulation in Dilute Emulsions’ by Dukhin and Sjöblom makes up a quarter of the whole book (140 pages). This chapter analyzes in detail the mechanisms of flocculation and coagulation and their mathematical description. With the text, the authors provide an impressive list of 255 bibliographic citations which is useful to those still in need of more specific information. In chapter three Bellocq focuses on flexible surfactant films. This chapter gives an extensive overview of the most recent achievements in the field of microemulsions. The authors discuss in detail phase diagrams and theories for transition between different structures. Bellocq also explains the differences between microemulsions, macroemulsions, lamellar liquid-crystalline phases and sponge phases. At the end of the chapter, hints for the technical application of microemulsion systems are given.

Chapter four by Breen et al. deals with the destabilization of emulsions, which plays an important role in the field of crude-oil emulsions. The authors stress extensively thin-film rheology, Marangoni–Gibbs effects and the occurrence of microstructures in ultrathin films. The next three chapters deal with specialized emulsions. ‘Food Emulsions’ by Dalgleish analyzes the problems encountered when dealing with emulsions for nutrition purposes. This includes the surfactants used in food emulsions and their emulsifying activity, the formation of emulsion, stability aspects and, also, considerations about

the structure of emulsion droplets and interfacial films. Ber-genstahl and Oestberg present, in chapter six, a review of alkyd-based emulsions. They discuss stability and instability of water-borne paints and their drying properties. ‘Perfluor-ocarbon-based Emulsions as Red Cell Substitutes’ written by Kaufmann is the subject of the last chapter in this section. Main topics of this chapter are the theoretical background of temporary oxygen transport and the clinical use of PFC emulsions.

The third, and last, section of this book presents three of the most recent analytical techniques to characterize emulsified systems. Soedermann and Balinov introduce the reader to the use of the NMR self-diffusion method. The authors explain the theory and technical details and demonstrate several applications. Sjöblom et al. then discuss the use of dielectric spectroscopy for monitoring flocculation processes in emulsions. The authors present several results from model emulsions, food emulsions and crude-oil emulsions where they show how flocculation and coalescence can be monitored very sensitively using the time-domain dielectric spectroscopy. The last chapter of this book by Froya and Nesse reviews the use of ultrasonic techniques to characterize emulsions. This chapter presents an introduction to the theory of propagation and attenuation of ultrasound waves when traveling through an emulsion. The authors also provide information about the experimental techniques currently used, and report on recent studies performed on o/w as well as w/o emulsions. In its 10 chapters, written by 20 chemists, this book gives, as claimed in its preface, a fundamental presentation of emulsion science. The volume includes illustrative tables, figures, equations and over 1550 bibliographic citations with the latest references being from 1995. A 6-page index allows one to rapidly find the information hidden in this book. A lot of information on recent achievements is provided within this book, highly valuable for scientists involved in this area. It can be recommended for both young scientists and more experienced professionals.

Prof. Dr. R. Daniels
Institut für Pharmazeutische Technologie
Technische Universität Braunschweig
Germany

PII S0939-6411(98)00061-7