

Reactive Extraction

This booklet is designed to bridge the gap between handbooks and technical literature and aims at graduate students or experienced readers. Commercial flow sheeting simulation software is increasingly available and is used in the early steps of process design in industry. As to this, more sophisticated and precise models based on activities instead of concentrations should be used. After an introductory chapter there is in Chapter 2 an intensive discussion of reactive phase equilibria of ionic and non-ionic solutes based on chemical potentials. Chapter 3 introduces to multicomponent diffusion and mass transfer. However, the main focus is on the reactive mass transfer on rigid and mobile surfaces where the interfacial reaction, molecular diffusion and adsorption layers are decisive. The respective extraction of zinc with a cation exchanger and of acetic acid with an anion exchanger is discussed as case studies. Since adsorption layers and surfactants have a major impact on liquid-liquid extraction efficiency, the final chapter reviews several techniques which make use of polymeric species in an extractive process. A short review is also given on extraction apparatus and the hydrodynamics (hydraulic design, droplet population balances) of columns. Much of the booklet is based on the PhD works of C. Czaplá (2000), G. Modes (2000), H. Klocker (1996), T. Kronberger (1995), M. Marters (2000), M. Roos (2000), M. Traving (2000) and B. Wachter (1996) who I wish to thank for their fruitful contributions.

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