An introduction to Interfacial Engineering

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Preface

In 2004 the first course on Interfacial Engineering was given a the chemical engineering department DelftChemTech of Delft University of Technology. Before that time, there was some coverage with colloidal systems in courses on physical chemistry and a voluntary course on "disperse systems". The idea was to give a course that would deal with colloidal phenomena while giving a good perspective on technological applications. Hence the name Interfacial Engineering. The teaching goal of the course was set at a decent level: after studying the course, the students should be able to critically assess the relevant scientific literature.

This first course was developed simultaneously with prof. dr. Theo van de Ven (McGill University, Montreal), who was a visiting professor of the department at the time. A significant amount of course material was generated from which the students could study, but a textbook covering all topics of the course was not available. Over time, the idea developed to write one myself. The result of half a year writing text while teaching the course is what you are reading now. The book is still under construction. Many ideas have been put into this book and the coverage is not fully balanced yet. Also, the text will not be without flaws. Therefore, any suggestion or correction will be welcomed so that in a following print more accuracy will be attained.

The contents of the book can be roughly divided into two parts. The first part contains the basic knowledge required to deal with colloidal systems albeit that some technological issues are discussed. These are the chapters 1 - 5. With these chapters, there is a bundle of worked exercises, taken from the author's own experience and from other textbooks, that will be available upon request. The chapters 6 - 8 deal with technologies such as emulsification, film formation and flotation. In these last chapters some new fundamental issues are discussed where necessary but the emphasis is on the application.

In a half-semester course – of weekly 2 consecutive lecture hours – one chapter is discussed, sometimes together with some exercises. The last three chapters are discussed in conjunction with scientific papers from the contemporary literature. This teaches the students how to use their knowledge with published material and how to extract key information for a given process. Particular attention is paid on how to read a scientific paper, how to extract information from it, and how to evaluate its significance. A method has been developed to do this systematically. Subsequently, some calculations are made with the material presented in the paper where it does occur that another conclusion is drawn than in the paper. The exam for the students consists of the assessment of a – small –

scientific paper and some relevant calculations.

Most of the information in this book is not mine. It is the accumulated knowledge of the field and I acknowledge all contributors: there are too many to name and I feel indebted to them all. My role has been to make a selection of topics and to organize and discuss these in such a way as to teach chemical engineers the essentials about colloid science and its technological applications.

Finally, I thank all who have helped me writing this book and Delft University of Technology for their support. Last but not least I thank my wife and children for their patience: they had to suffer my absence during long evenings of working to finish this work.

Ger Koper,
Leiden, 5 March 2007.

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