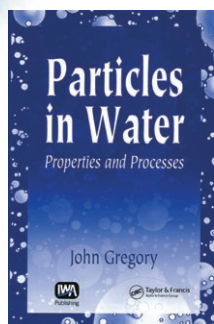




Particles in Water



Properties and Processes. Edited by John Gregory. CRC Press/Taylor & Francis, Boca Raton 2006. 180 pp., hardcover \$ 129.99.—ISBN 1-587160-85-4

Nowadays, when students coming from chemistry, geology, biology, or even physics become involved with “particles in water”, they face a major challenge. Only a few of them will have had the advantage of a course dedicated solely to the fundamentals of natural particles in aqueous media. They will quickly find themselves in a situation where they dig through thousands of book pages dealing with general colloid chemistry, particle separation, particle technology, or even applied physics and light-scattering theory. Even though these will supply many interesting details, it is probably not the stuff that the student was looking for at the starting point of his

engagement with natural particles and colloids in aqueous media.

That is exactly where this new book by John Gregory comes into play. As we can learn from him in his foreword, he also started as a chemist being confronted with the principles of the movement of natural particles in deep-bed filters. It seems that, even after long years of very successful work on this and related topics, the author can remember very well what it meant to work oneself into this subject.

However, it is surprising that, in a time when introductions to colloid chemistry, particle analysis, or aggregation phenomena can easily fill 500 or more pages, this book comes along with not even 200. It appears impossible to cover all the important topics in such a limited number of pages without becoming inaccurate or unreadable. However, it seems to us that the author, as a scientist involved with practical problems, has managed very well to condense the topic down to the relevant points needed for a first introduction. It is clear from the size of the book alone that it does not claim to cover everything in great detail.

Gregory starts with a general overview of naturally occurring particles, general particle properties, size ranges, size distributions, and analytical techniques. He then focuses on the important factors such as surface charge and the electrical double layer which determine the behavior of the particles to a major extent. Particles in water move and interact with the surrounding medium or with each other (aggregation), and, if they are large and dense enough, they settle. This is described in Chapters 4–6, which touch on important points such as DLVO and non-DLVO forces, retarda-

tion effects, and the effects of collectors of different shapes, while the practical implications are mainly restricted to water treatment and particle removal. The concepts of particle collisions, collision mechanisms, and the formation and structure of aggregates are summarized in Chapter 6, including fractal concepts. Chapter 7 focuses on particle removal in water treatment, but the background of filtration theory is also good to know if one is concerned with, for example, colloidal transport in groundwaters.

We found the discussion of light-scattering theory quite extensive compared with only one page on electron microscopy, and the subchapter on particle analysis is simply too short, and does not cover the majority of suitable methods. Also, the discussions are largely restricted to ideally spherical particles, which are probably those that are least commonly found in nature.

For readers who are already familiar with the subject, or those who want to refresh their knowledge of some basics or prepare some extra slides for their environmental chemistry courses, this book is suitable for Sunday afternoon light reading. Students, or even established researchers and practitioners, will profit from this book if the topic of particles in water is an interesting side-aspect of their work. Last but not least, this book is an ideal starting point for those who are unfamiliar with the concepts of colloidal chemistry, before they move on to the more detailed and incomparably more extensive literature.

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