



Light Scattering by Particles in Water: Theoretical and Experimental Foundations

Miroslaw Jonasz, Georges Fournier

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Light scattering-based methods are used to characterize small particles suspended in water in a wide range of disciplines ranging from oceanography, through medicine, to industry. The scope and accuracy of these methods steadily increases with the progress in light scattering research. This book focuses on the theoretical and experimental foundations of the study and modeling of light scattering by particles in water and critically evaluates the key constraints of light scattering models. It begins with a brief review of the relevant theoretical fundamentals of the interaction of light with condensed matter, followed by an extended discussion of the basic optical properties of pure water and seawater and the physical principles that explain them. The book continues with a discussion of key optical features of the pure water/seawater and the most common components of natural waters. In order to clarify and put in focus some of the basic physical principles and most important features of the experimental data on light scattering by particles in water, the authors employ simple models. The book concludes with extensive critical reviews of the experimental constraints of light scattering models: results of measurements of light scattering and of the key properties of the particles: size distribution, refractive index (composition), structure, and shape. These reviews guide the reader through literature scattered among more than 210 scientific journals and periodicals which represent a wide range of disciplines. A special emphasis is put on the methods of measuring both light scattering and the relevant properties of the particles, because principles of these methods may affect interpretation and applicability of the results. The book includes extensive guides to literature on light scattering data and instrumentation design, as well as on the data for size distributions, refractive indices, and shapes typical of particles in natural waters. It also features a comprehensive index, numerous cross-references, and a reference list with over 1370 entries.

An errata sheet for this work can be found at: http://www.tpdsci.com/Ref/Jonasz_M_2007_LightScatE.php

^{*}Worked exercises and examples throughout



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^{*}Extensive reference section provides handy compilations of knowledge on the designs of light scattering meters, sources of experimental data, and more

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