

Giant Micelles: Properties and Applications (Surfactant Science)

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The co-evolution of a strong theoretical framework alongside application of a range of sophisticated experimental tools engendered rapid advancement in the study of "giant micelles." Beginning with Anacker and Debye's 1951 experimental study of elongated micelles by light scattering and their subsequent theoretical inference that the thermodynamics of these structures would have to reflect an opposing force model, theory and experiment have progressed hand in hand. This progress, along with growing interest in the practical and industrial applications of these structures in cleansers, cosmetics, pharmaceuticals, and energy production, demands a comprehensive, single-source reference to the current state-of-the-science.

Drawing on the expertise of internationally known scientists, **Giant Micelles: Properties and Applications** summarizes the range of behaviors encountered in solutions of micelles and their applications in industrial processes. The book introduces theoretical aspects of the rheological behavior and formation of giant micelles from different viewpoints including molecular-level thermodynamic theory and computer simulations. It continues by focusing on the results of a variety of experimental studies using methods such as cryo-transmission electron microscopy, scattering techniques, phase diagrams, linear and non-linear rheology, and chemical relaxation. Illustrating the properties of giant micelles on solid surfaces, the book also considers systems of smart micelles that respond to external stimuli by a change of shape. The authors describe giant micelles formed from amphiphilic block copolymers as well as non-covalent polymers that exhibit similar rheological behavior to giant micelles. Finally, the chapters address current and emerging applications of giant micelles in oil and gas production, drag reduction, drug-delivery formulations, and personal care products such as shampoo.

By gathering a range of information into one volume, **Giant Micelles: Properties and Applications** provides scientists with an essential reference on these fascinating materials and their emerging role in industrial application.

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Giant Micelles: Properties and Applications (Surfactant Science) From CRC Press Bibliography

Sales Rank: #5990817 in Books
Published on: 2007-05-30
Original language: English

• Number of items: 1

• Dimensions: 8.35" h x 1.39" w x 6.14" l, 1.97 pounds

• Binding: Hardcover

• 576 pages

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