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Deducing Shape of Anisotropic Particles in Solution from Light Scattering: Spindles and Nanorods. ILONA TSUPER, DANIEL TERRANO, KIRIL A. STRELETZKY, Cleveland State University, OLGA V. DEMENT'EVA, SERGEY A. SEMYONOV, VICTOR M. RUDOY, Frumkin Institute of Physical Chemistry and Electrochemistry, Moscow, Russia — Depolarized Dynamic Light Scattering (DDLS) enables to measure rotational and translational diffusion of nanoparticles suspended in solution. The particle size, shape, diffusion, and interactions can then be inferred from the DDLS data using various models of diffusion. Incorporating the technique of DDLS to analyze the dimensions of easily imaged elongated particles, such as Iron (III) oxyhydroxide (FeOOH) Spindles and gold Nanorods, allows testing of the models for rotational and translational diffusion of elongated particles in solution. This, in turn, can help to better interpret DDLS data on hard-to-image anisotropic wet systems such as micelles, microgels, and protein complexes. This study focused on FeOOH Spindles and gold nanorod particles. The light scattering results on FeOOH analyzed using the basic model of non-interacting prolate ellipsoids yielded dimensions within 17% of the SEM measured dimensions. The dimensions of gold nanorod obtained from the straight cylinder model of DDLS data provided results within 25% of the sizes that were obtained from TEM. The nanorod DDLS data was also analyzed by a spherocylinder model.

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