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**Characterizing FeOOH Nanorice in Solution Using Polarized and Depolarized Light Scattering** PHIL DEE, Cleveland State University, OLGA DEMENT'EVA, VICTOR RUDOY, Frumkin Institute of Physical Chemistry and Electrochemistry, KIRIL STRELETZKY, Cleveland State University — Characterizing spindle-shaped (nanorice) particles of iron(III) oxyhydroxide (FeOOH) within their native solution environment is essential for understanding their properties for specific applications such as targeted synthesis of core/metal nano-shell structures. The combination of Dynamic Light Scattering (DLS), Static Light Scattering (SLS) and carefully designed Depolarized Dynamic Light Scattering (DDLS) allows to measure translational and rotational dynamics, structure, and size distribution of nanorice *in situ*. In addition, DLS/SLS/DDLS provides sampling of a large number of nanorice particles as opposed to a few particles typically probed by the imaging techniques. The prolate ellipsoid and solid cylinder models were used to deduce FeOOH nanorice dimensions. The ellipsoidal model generally produced nanoparticle lengths and aspect ratios within 10-20% of the transmission electron microscopy (TEM) results. The cylinder model performed slightly worse. The effects of number concentration of FeOOH nanoparticles in solution on their dynamics were also studied to understand the degree of coupling between the rotational and translation diffusion under different conditions.

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