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Correlating Wet-Sample Electron Microscopy with Light Scattering Spectroscopy on the Example of Polymeric Microgels. CHRISTIAN GUNDER, PETRU S. FODOR, KIRIL A. STRELETZKY, Cleveland State University — Amphiphilic cellulose-based microgels with a reversible volume-phase transition at around 40.5C (the low critical solution temperature (LCST)), have been synthesized, characterized, and optimized. The specific size dependence on the temperature exhibited by these microgels and their bio-compatibility makes them attractive systems for drug delivery and bio-sensing. In this work, in order to study the characteristics of their response under dynamic temperature conditions, both light scattering spectroscopy, as well as electron microscopy are used. While the light scattering data provides critical insights in regard to the size, shape, molecular weight and dynamics of the microgel particles investigated, the data obtained represents an average over the relatively large sample volume accessed by these optical techniques. Thus, the data interpretation can be greatly strengthened with supporting direct imaging measurements capable of monitoring individual particles with high spatial resolution, such as electron microscopy. To this end we develop methods enabling the electron imaging of microgel samples while maintaining their solution environment. In this context, one of the approaches that proved viable, is using a specially designed capsule in which the sample is sealed behind a thin SiN window that isolates the liquid sample from the electron column vacuum. We discuss the correlation of the imaging results obtained through these methods, with the data obtained from light scattering.

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