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Imaging of the Soft Matter Particulate Systems by Scanning Electron Microscopy RICHARD SENT, SAMANTHA TIETJEN, PETRU FODOR, KIRIL STRELETZKY, Cleveland State University — Polymeric microgels suspended in water exhibit a reversible volume transition phase upon heating which leads to nanoparticles deswelling by as much as a factor of 15 in volume. Microgels are typically characterized by noninvasive techniques of dynamic light scattering (DLS), which probe particle structure/dynamics. More direct methods such as scanning electron microscopy (SEM) are useful for visualizing polydisperse microgel samples. As SEM typically uses high vacuum to characterize dried samples it is problematic as the dehydrated microgels collapse under vacuum. This project explores wet particle imaging in an ionic liquid stable under high vacuum. Particles were suspended in a thin ionic liquid film on a copper grid and were studied for both size distribution and dynamics. The experiment was tried on separate suspensions of silica particles and polymeric microgels. The silica particles exhibited Brownian motion proving the concept of the approach. While the average SEM sizes of microgels generally agreed with sizes obtained by DLS in ionic liquid at room temperature, the initial attempts at diffusion analysis using SEM particle tracking yielded mixed results. The microgels were often observed to drift significantly, clustering with nearby particles and drifting towards the grid edges.

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