Understanding Coalescence Behavior of Nanoparticles by using Graphene Liquid Cell with Self-Assembled Nanochamber Arrays

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Liquid phase transmission electron microscopy (LPTEM) is a novel approach for the characterization of dynamic processes in liquid media with high spatial and temporal resolution. The dynamic motion and interaction between metal nanoparticles are investigated by using liquid phase TEM by using advanced graphene liquid cell. The cell is based on highly-ordered nanoscale chambers of a self-assembled anodic aluminum oxide (AAO) membrane, encapsulated with graphene windows on both sides. This structure has a number of nanochambers with uniformity in their sizes, distributions, and thickness, which allows facile and fast imaging with high-resolution. We monitor the coalescence behavior of nanoparticles depending on capping agents. Our cell can provide a reliable platform for high resolution transmission electron microscopy imaging, spectral mapping, and further statistical analysis.