470f Silver Carboxylate Nanostructure Nucleation and Growth on Agbr Crystals

Alon V. McCormick, Jingshan Dong, David R. Whitcomb, and H. Ted Davis

From Cryo-TEM studies, we have found that the initial stage of the reaction (the first few minutes) between an aqueous dispersion of sodium stearate (NaSt) and $AgNO_3$ (aqueous solution) produces silver stearate micelles, $[(C_{18}H_{35}O_2)_x(Na_{x-y})(Ag_y)(H_2O)_z]$, and aggregates of these silver stearate (AgSt) micelles in the form of cubic, pre-AgSt crystals. When cubic grains of 50 nm AgBr are added to the NaSt dispersion prior to the $AgNO_3$, the reaction proceeds to form the silver stearate micelles, but not the aggregation of those micelles. Instead, the {111} silver ion planes of the AgBr cubic crystal corners provide nucleation sites for silver stearate micelle deposition and crystal growth. After nucleation, the AgSt micelles form bud-like structures *via* an epitaxial interface on one or several corners of each AgBr cubic crystal. Over time, the buds grow longer and link their free ends from the same or different AgBr crystals. The linkage builds the buds into doughnut-shaped structures, which grow through coalescence or ripening processes. This talk will discuss the characterization of the epitaxial interface between the AgBr and AgSt crystals that is formed in the early stage of the reaction.