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What Controls the Size of Silver Glutathionate Molecular Nanoparticles During Their Formation? YEAKUB ZAKER, The University of Toledo, NATHAN DIEMLER, University of Pittsburg, BRIAN ASHENFELTER, The Walt Disney Company, ANIL DESIREDDY, C-Crete Technologies LLC, BADRI BHATTARAI, TERRY BIGIONI[1], The University of Toledo — Size control remains a longstanding challenge in the production of molecular metal nanoparticles. For example, the silver:glutathione (Ag:SG) system is known to produce >20 different discrete molecular species, therefore isolation of any particular size requires size fractionation of the mixed-size products. It is possible to obtain singular Ag:SG nanoparticle products by attrition, i.e. destroying all but the desired product, but this is a laborious procedure with low yield. Here, we present a methodology for producing nearly single-sized products of Ag:SG molecular nanoparticles directly, with no post-processing required, with good yield. By studying the consequences of different reaction conditions on the size distribution, the effects of reduction rate, pH, buffer composition, temperature, time, and precursor solubility could be disentangled. The rate of the reaction was found to have the most significant effect, with slower reaction rates producing small sizes and the narrowest distributions. These results were used to develop a facile method for producing $Ag_{15}(SG)_{11}$ and $Ag_{32}(SG)_{19}$ in high yield.

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