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Synthesis Methods for the Creation of Gold Nanoparticle Heat Transfer Fluids ERIKA SWARTZ, REBECCA CHRISTIANSON, JESSICA TOWNSEND, Franklin W. Olin College of Engineering, THOMAS KODGER, DAVID WEITZ, Harvard University — In the past fifteen years, nanofluids have been studied as heat transfer and storage fluids. The citrate reduction synthesis method, originally developed in the 1950's, produces stable aqueous solutions of gold nanoparticles for this application. A variety of particle sizes can be produced by varying the citrate concentration at reduction. In this work, we present a repeatable synthesis protocol for solutions of gold nanoparticles. Our investigation of the heat transfer and storage properties of nanofluids required gold solutions with volume fractions above the upper limits reported in the literature for the citrate synthesis. We report protocols to create stable suspensions of highly concentrated gold nanofluid. In addition, we describe protocols and methods for the controlled destabilization of these fluids in order to study their properties when aggregated.

Rebecca Christianson
Franklin W. Olin College of Engineering

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