

Abstract Submitted
for the TSF14 Meeting of
The American Physical Society

One Step Microwave Dendrimer Synthesis of Monodisperse Size Controlled Tunable Noble Metal Nanoparticles using PEI JEWELL ANNE HARTMAN, KIM HART, BRYCE BROWNFIELD, KYLE CULHANE, JUSTIN CASE, ANDREW BALLAST, KE JIANG, ANATOLIY PINCHUK, University of Colorado Colorado Springs, PINCHUK NANOPHOTONICS RESEARCH GROUP TEAM — The size controlled synthesis of tunable, near monodisperse and stable noble metal Au and Ag nanoparticles with a narrow size distribution was achieved through the development of a parameter dependent one-step microwave assisted dendritic polymer stabilized technique. The one-step dendrimer assisted technique uses polyethelenimine (PEI) as both a reducing and stabilizing agent that encapsulates the nanoparticles for the synthesis of stable, size controlled noble metal Au and Ag nanoparticles. PEI was chosen to ensure stability of the nanoparticles produced. The effect of the parameters of time and temperature on the size of the nanoparticles produced was explored through the Box-Behnken design. Size control was achieved through a dual faceted process by modifying the mass ratio of metal salt to dendrimer or maintaining the mass ratio and modifying the temperature. Nanoparticle sizes were estimated using UV/Visible Absorption Spectroscopy, Dynamic Light Scattering, and Scanning Electron Microscopy. Mie theory calculations of the extinction spectra for an identical size nanoparticle are also presented.

Jewell Anne Hartman
University of Colorado Colorado Springs

Date submitted: 30 Sep 2014

Electronic form version 1.4