

Abstract Submitted
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Improving the Stability of Fluorescent Silver Nanoclusters¹

NICHOLAS SWANSON, DANIELLE STANKO, IAN CAMPBELL, BRUCE WITTMERSHAUS, School of Science, Pennsylvania State University: Erie, The Behrend College — The quantum mechanical nature of noble metal nanoparticles results in them having optical properties much different from the bulk metal. Silver nanoclusters (AgNC), groups of 4 to 20 atoms, are characterized by strong optical transitions in the visible part of the spectrum giving them an appearance like fluorescent organic dyes. These nanoclusters can also have fluorescence quantum yields over 90%. Following the analysis of published results of DNA templated nanoclusters, we created a procedure for synthesizing AgNC. The AgNC have a high fluorescence quantum yield but degrade with a lifetime of only a few days when in solution at room temperature. Our goal in this study was to increase the stability of the AgNC towards improving their value as a fluorescent material in various applications, such as luminescent solar concentrators. To increase their stability, weve chosen to modify our procedure by removing oxygen from the solution after the sample has reacted. Oxygen removal caused a significant increase in the stability of the clusters over a given period of time.

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Nicholas Swanson
School of Science, Pennsylvania State University: Erie, The Behrend College

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