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**SANS and SAXS Studies of DNA-Templated Silver Nanoclusters** HONGYU GUO, SUNIL K. SINHA, Department of Physics, UC San Diego, JASWINDER SHARMA, JENNIFER S. MARTINEZ, ANDREW P. SHREVE, Center for Integrated Nanotechnologies, Los Alamos National Laboratory — Due to the high affinity of silver cations ( $\text{Ag}^+$ ) for DNA bases, following reduction of the  $\text{Ag}^+$ , silver atoms may form short oligonucleotide-encapsulated Ag nanoclusters ( $<1$  nm) without the formation of large particles. Such DNA-templated silver nanoclusters have received significant attention as potential fluorescent labels due to their useful properties, including high molar absorptivities, good quantum yields and photostability, and small size. It is thus of great interest to find out the configuration of the Ag nanoclusters which associate with the DNA strands. We have conducted Small Angle Neutron Scattering (SANS) and X-ray Scattering (SAXS) experiments to investigate the formation of the Nanoclusters. By comparing SANS and SAXS data from conjugated samples, pure DNA and DNA/Ag complex, we can characterize the size and position of the Ag clusters along the DNA strand. The time evolution of the DNA/Ag complex can also be studied and can be understood as due to silver oxidation, reduction, or regrouping. We find that the formation and aging of the Ag Nanoclusters are also strongly dependent on the DNA template sequence.

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