

## **SYNTHESIS OF SILVER NANOPARTICLES EMBEDDED IN SILICOPHOSPHATE MATRIX**

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### **Abstract**

Silver nanoparticles are known for limited thermal stability and easily undergo aggregation and slow growth to bulk material if there is no protective layer on their surface. In this work we studied the preparation of the silver nanoparticles embedded in silicophosphate matrix to prevent the nanoparticle aggregation, sintering, and growth. Silver nanoparticles were prepared by solvothermal decomposition of bis(dodecylamine)silver nitrate in dodecylamine. Size distribution of nanoparticles was studied by DLS and SAXS measurements. This procedure allows for the formation of monodisperse (10 nm) Ag nanoparticles with organic shell which can be easily dispersed in the silicophosphate sol prepared by non-hydrolytic sol-gel reactions. The transformation to stiff gel traps the nanoparticles in the matrix. The efficiency of protective layer was tested by DSC experiments where the small Ag nanoparticles should display melting point depression. Influence of the silicophosphate-to-Ag ratio was studied. Resulting products were characterized by a variety of physico-chemical methods, such as IR, PXRD, and TG/DSC. Reaction byproducts were determined by GC-MS spectrometry.

**Keywords:** Silver, Nanoparticles, Silicophosphate

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