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Contents

CMN PP 02

Green synthesis of nanoparticles: Pulsed Laser Ablation in Liquids

Milica Nemoda[1], Miloš Momčilović[1], Miloš Ognjanović[1], Sanja Živković[1]

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Laser ablation synthesis in liquid solution (PLAL) is a green technique that allows for the physical formation of ultrapure nanomaterials. In this work, Ag and Au nanoparticles are synthesized by PLAL using two different neodymium-doped yttrium aluminum garnet (Nd:YAG) laser systems. A pure silver/gold target (99.998% purity) was immersed in Milli-Q water and the sample surface of approximately 1 cm^2 in size was continually scanned by a pulsed laser beam to achieve a homogenous ablation. Obtained suspensions were analyzed by ICP-OES, UV-Vis, TEM, and DLS. UV-Vis spectra showed characteristic peaks at 428 nm and 525 nm, which correlate with silver and gold nanoparticles' surface plasmon absorbance. ICP-OES analysis confirmed that these suspensions are free from impurities. Since no stabilizer is added, these nanoparticles tend to agglomerate in time, as TEM and DLS analysis confirmed (Figure 1). Nevertheless, these nanoparticles can be easily functionalized with a variety of ligands such as small molecules, surfactants, dendrimers, polymers, and biomolecules to get desirable functionalities for various applications.

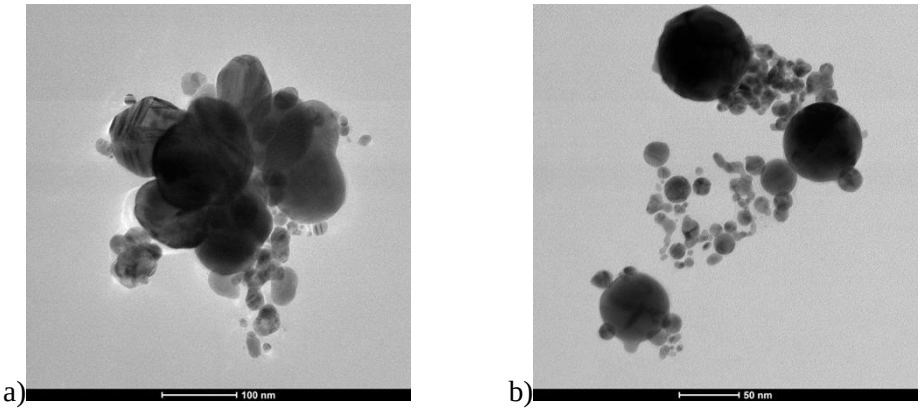

Figure 1. TEM images of a) silver and b) gold nanoparticles

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