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V. GÁMEZ-ALBO: Synthesis of silver nanoparticles in a liquid medium for application as bactericidal and fungicidal agents.

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In this work, a fast and efficient method for the synthesis of silver nanoparticles coated with silica by means of the laser ablation technique in combination with oxidation-reduction mechanisms in aqueous solution is presented. This method is a chemical synthesis where the reducer agent is introduced in nanometer form by laser ablation of a solid target submerged in an aqueous solution. In a first step a silicon target immersed in water was ablated for several minutes. After this, the material extracted and suspended in the solution was re-irradiated using a lower energy density to finish fractionating the larger particles. Subsequently, an aliquot of an AgNO3 dissolution was added and the redox reaction produced between the silver ions and ablation products leads to a colloidal suspension of core-shell Ag@Silica NPs. For the stability of the colloids, Na2CO3 was also added to the solution. Once synthesized, silica-coated silver nanoparticles can be used as bactericidal agents when irradiated with a low energy density in the absorption region, which causes resonance of surface plasmons, resulting in several scenarios that can cause death of nearby bacteria. However, for fungicidal applications where the specimens are larger, an AlCl3 solution was used to promote the tendency of the nanoparticles towards agglomerations, which allows such application. On the other hand, the colloidal suspensions were studied by UV-VIS-NIR spectroscopy, dynamic light scattering (DLS) and electrophoretic light scattering (ELS). Also, pH measurements were carried out.

Session Classification: SHORT TALKS

Track Classification: SYMPOSIUM ON LASER ABLATION