

## Ag nanoparticles synthesized from *Ganoderma lucidum* for SERS-applications

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Long-standing intense research on synthesis and functionalization of Ag nanoparticles (NPs) is due to the unique combination of antibacterial, optical, electrical, and catalytic properties, stimulating various applications. Most progress is currently made in the area of anti-pathogen applications and applications based on localized surface plasmon resonance (LSPR), such as sensors and SERS-substrates (surface-enhanced Raman spectroscopy). Among numerous synthesis routes, there is an increasing number of reports on phytosynthesized silver NPs, based on an extract of different parts of plants.

Here we report application of mycosynthesized Ag NPs, obtained using *Ganoderma lucidum* fruit body extract as the bioreducing and stabilizing agent, as a substrate for Surface-Enhanced Raman Scattering (SERS). Stable Ag NPs colloids with distinct plasmonic resonance in UV-blue range (Fig. 1a,) were obtained for a broad pH range (5-11). At very acidic conditions, pH=2.5, synthesis efficiency drops but the formation of plasmonic NPs still takes place. All the NP samples were tested as a SERS-substrate, using standard dye analyte, rhodamine 6G. In addition to the dependence of the enhancement efficiency on the NP synthesis conditions, we observe spectral effects that can be related to the adsorption geometry of the molecule on the NP surface in different conditions, in particular, in solution and after drying the Ag NP/analyte composite on the substrate.

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### Topics

Session A. Physics of condensed matter and spectroscopy

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