

Synthesis of Flower-Like Silver Nanoarchitectures in Special Shapes and Their Applications in Surface-Enhanced Raman Scattering

Authors : Radka Králová, Libor Kvítek, Václav Ranc, Aleš Panáček, Radek Zbořil

Abstract : Surface-Enhanced Raman Scattering (SERS) is an optical spectroscopic technique with very good potential for sensitive detection of substances. In this research, active substrates with high enhancement were provided. Novel silver particles (nanostructures) with high roughened, flower-like morphology were prepared by reduction of cation complex $[\text{Ag}(\text{NH}_3)_2]^+$ in presence of sodium borohydride as reducing agent and stabilized polyacrylic acid. The products were characterized by UV/VIS absorption spectrophotometry. Special shapes of silver particles were determined by scanning electron microscopy (SEM) and transmission electron spectroscopy (TEM). Dispersions of this particle were put on fixed substrate to producing suitable layer for SERS. Adenine was applied as basic substance whose effect of enhancement on the layer of silver nanostructures was studied. By comparison with our work, the important influence of stabilizers, polyacrylic acid with various molecular weight and concentration, on the transfer of particles and formation of new structure was confirmed.

Keywords : metals, nanostructures, chemical reduction, Raman spectroscopy, optical properties

Conference Title : ICNSE 2014 : International Conference on Nanomaterials Science and Engineering

Conference Location : Istanbul, Türkiye

Conference Dates : July 30-31, 2014