FABRICATION OF NOBLE METAL-CHITOSAN SUBSTRATES FOR SURFACE-ENHANCED RAMAN SPECTROSCOPY (SERS)

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Surface-enhanced Raman spectroscopy (SERS) is an analytical technique based on Raman scattering that allows a qualitative determination of a wide range of compounds, ranging carbonaceous matter to complex organic compounds. In contrast to the mean Raman spectroscopy, the intensity of the bands in SERS is higher due to the plasmonic properties of the silver and/or gold nanoparticles, leading to lower detection limits. However, the preparation of the most commonly used SERS substrates require expensive techniques such as litography and thus, novel, greener, and low-cost methods for the fabrication of SERS substrates are investigated. In this work, nanostructures composed by a polymeric chitosan matrix and noble metal nanoparticles with different morphologies were obtained and their performance as SERS substrates was evaluated. The substrates were characterized by SEM, Raman spectroscopy. In order to evaluate the detection and enhancement factor of the nanostructured substrates, rhodamine 6G solutions with different concentrations were analyzed. These procedures represent a greener, low-cost, and reproducible alternative for the fabrication of SERS substrates; also, the incorporation of chitosan is the first step for future research in biocompatible substrates.

Keywords: SERS, noble metal nanostructures, chitosan

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