Special Issue

Surface-Enhanced Raman Scattering Sensors and Applications: Recent Advancements and Perspectives

Message from the Guest Editors

Surface-enhanced Raman spectroscopy is a technique with the potential to detect species down to the single molecule level thanks to the tremendous enhancement of the Raman signal at the surface of some nanomaterials. Many SERS systems have been developed and proposed as efficient systems that have found a wide range of applications in chemical sensing, biomedical and environmental analysis, agri-food and cultural heritage studies. A SERS sensor is either based on the direct molecular signal of the analyte or based on the indirect signal of a Raman reporter molecule attached to the SERS nanostructure. The gain in the Raman signal of the analytes with SERS substrates can reach values as high as 10^10–10^11, and the SERS sensor allows high sensitivity with intrinsic specificity for determining structural information about molecular systems. A major drawback of metallic nanostructured SERS substrates was previously represented by a low reproducibility of the SERS response; however, great efforts in the manufacturing of SERS-active nanomaterials have been made such that reliable and cost-effective SERS sensor devices are now available.

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