Noble metal nanoparticles and applications in surface enhanced Raman scattering

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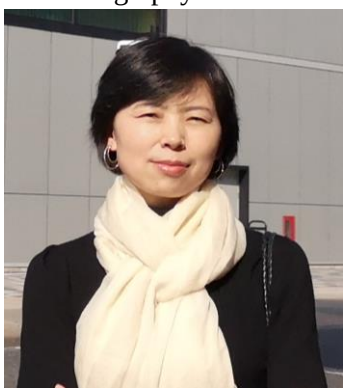
Noble metal materials have negative real part and small imaginary part of the dielectric constant at optical frequencies, so the nanoparticles formed by noble metal materials possess an ability to localize and amplify the incident electromagnetic radiation near the surface of nanoparticles once the plasmonic resonance condition is fulfilled. If a molecule is located near the surface of noble metal nanoparticles, and the wavelength of the incident laser is close to the plasmonic resonance peak of noble metal nanoparticles, the overall Raman scattering intensity of the molecule is significantly magnified due to the double enhancement acting on the incident light and the scattered light. This phenomenon is called surface enhanced Raman scattering (SERS). An ideal SERS substrate constructed from noble metal materials plays a vital role in SERS research. Here two types of SERS substrates are introduced. One is composed of silver nanoparticles by in-situ growth process and its enhancement is originated from the localized surface plasmon resonance (LSPR). The other is gold grating/ gold nanoaprticles hybrid structure in which the coupling between the surface plasmonic resonance (SPP) and LSPR is excited to obtain higher enhancement factor.

Short biography:



Chunfang Wu received PhD degree from Lanzhou University, China in June in 2008. Her doctoral dissertation is focused on the preparation and the photo-luminescent properties of rare earth doped phosphate phosphors. She was an associate professor in Lanzhou University from May 2011 to Sept. 2016 and in Xi'an Technological University from Oct. 2016 to Dec. 2021. From Jan. 2022 to now, she is a professor in Xi'an Technological University. Recently she pay attention to the preparation of noble metal nanoparticles and their applications in SERS (Surface Enhanced Raman Scattering).