Single molecule Raman detection from Ag coated Au nanodumbells

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Raman scattering has been one of the well-known spectroscopic phenomena since 1928 when it was first observed by C.V. Raman. With the state of the art of laser and silicon technology, Raman spectroscopy enjoys its renaissance in modern days. Based upon newly developed stabilized diode lasers and the extremely sensitive charge coupled devices, advanced atomics force microscopy and optical coating technology, our group has been developing nano-Raman spectroscopy such as AFM-correlated Raman spectroscopy. In the presentation, I'll briefly introduce the current trends and status of Raman spectroscopy followed by the works on surface enhanced Raman detection at single molecule level. Surface-enhanced Raman scattering (SERS) is a broadly used techniques for signal amplification of weak Raman signal using plasmonic nanostructures. We reported a high-yield synthetic method for SERS-active gold-silver core-shell nanodumbbells, where the gap between two nanoparticles and the Raman-dye position and environment can be engineered on the nanoscale. Atomic-force-microscope-correlated nano-Raman measurements of individual dumbbell structures demonstrate that Raman signals can be repeatedly detected from single-DNA-tethered nanodumbbells.

References

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