Surface-Enhanced Raman Spectroscopy of Organic Crystals

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ABSTRACT

Surface-enhanced Raman scattering (SERS) has been widely used for spectroscopic detection of various substances with high sensitivity down to a single molecule level. Most previous implementations focus on (mono)-layers formed from a liquid or a gas phase. Here we obtained SERS spectra (Fig. 1a) of organic crystals (naphthalene) on randomly aggregated gold nanoparticles (NPs). We investigate the mechanism of surface enhancement in these systems such as the contact between the crystals and NPs as well as enhancement factors and reproducibility (Fig. 1b). Our results may be used to enhance sensitivity of previous Raman studies of crystals and their surfaces.

Figure 1: (a) Raman spectra of naphthalene crystals with (red) and without (blue) gold nanoparticles (NPs). (b) Schematic of organic crystals (green squares) on the surface of gold NPs.