

Surface-enhanced raman spectra of phthalimide. Interpretation of the SERS spectra of the surface complex formed on silver islands and colloids

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The surface-enhanced Raman scattering (SERS) spectra for phthalimide (PIMH) vacuum evaporated, cast onto silver island films, and from colloidal silver are clearly identified with the formation of a phthalimide-silver complex (chemisorption). The phthalimide-silver complex (PIMAg) has been obtained from the PIMH potassium salt and AgNO₃. The Raman scattering spectrum of the isolated complex is in agreement with the SERS spectra of the silver surface complex. The experiments were carried out using three laser lines at 514.5, 633, and 780 nm. The photochemical decomposition of the surface complex is detected with all laser lines. The spectral interpretation is aided using Hartree-Fock and local density functional theory (S-VWN) calculations, carried out to compute simulated SERS spectra using the molecular complex PIMAg and the PIMH. The calculated surface complex (SERS) Raman spectrum using S-VWN was found to be in good agreement with the observed spectrum. The observed Raman spectrum f