Comparative study of p-Aminothiophenol adsorption by Surface-Enhanced Raman Spectroscopy

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The organic compound p-aminothiophenol (PATP, HS-Ph-NH_2) has become very popular for checking the enhancement capability of novel substrates due to its very intense SERS spectra. SERS of PATP on metal nanoparticles is significantly different from its ordinary Raman spectra and it is very dependent on the particular experimental conditions. It has been demonstrated that PATP molecule can chemically transform to 4,4′-dimercaptoazobenzene (DMAB) upon adsorption, being this new compound the responsible of giving rise to new SERS bands [1]. In this work, we have studied the adsorption behavior of PATP on different metal substrates: silver electrode [2], silver colloids and bimetallic nanoparticles made of gold and silver. Additionally, theoretical DFT calculations have been performed for supporting the experimental data.

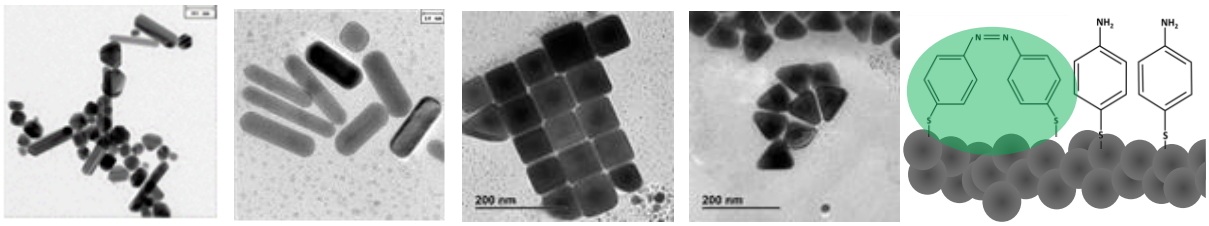

Figure 1. Different types of metallic and bimetallic nanoparticles and molecular adsorption configurations of PATP on the surface.

The analysis of the SERS results of the PAPT adsorbed on this type of nanoparticles leads us to deduce a very different catalytic capability in the dimerization of this adsorbate that depends directly on the morphology of the nanoparticle. These preliminary but fascinating results on these bimetallic systems are going to be the focus of further experiment in order to quantify the catalytic capabilities of these interesting nanoparticles.

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