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Vibrational Analysis of Rippled Nanoparticles ANNALISA PAWLOSKY, Virginia Tech-Society of Physics Students — The formation of mixed self-assembled monolayers on a flat gold surface (SAMs) results in randomly distributed phase separated domains. Rippled nanoparticles, however, control the formation and ordering of their domains on the nanoparticle surface. A particular combination of thiols produces surfaces that are rippled in nature giving these nanoparticles special properties. The morphology and domain spacing are directly controlled by the stoichiometric ratio of ligands used to synthesize the nanoparticles. Spectroscopy was used to observe certain CH stretching such as: hydrogen bonded dimers, OH stretch bands, C double bond O stretch bands and the C single bond O stretch bands. It was found that the rippled nanoparticles showed strong peaks in the hydrogen bonded dimer region, much stronger than its homogenous ligand counterparts. The trends that were seen related the symmetry of the frequency of the bonds to the order of the ligands on the nanoparticle. The more symmetric the frequencies of the bonds, the more ordered the bonds are. Nanoparticles with ripples from mixed ligands are seen to have an increase in their order of bond movement. Also, intermolecular forces change as a function of order and therefore, we can control the intermolecular forces with the ripples on the nanoparticles. We have found a vibrational spectroscopic signature of the ripples on the nanoparticles.

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