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Utilizing Nanoparticle Surface Plasmons for Surface-Initiated Polymerization and Conformational Switching of Polymers NELSON NUNALEE, JACK MOCK, ASHUTOSH CHILKOTI, STEFAN ZAUSCHER, Duke University — Spherical gold nanoparticles on the order of 50nm in diameter experience a localized surface plasmon resonance peak at an incident light wavelength of around 550nm. This resonance is a result of an extremely efficient coupling of the incoming oscillating electric field with the free electrons in the gold. Some of the light is absorbed, while some is scattered. The absorbed portion of light is lost to phonons in the gold, which results in localized heating. Our research seeks to capitalize on this heating to switch the conformational state of surface grafted stimulus-responsive poly(N-isopropylacrylamide) (pNIPAAm). Furthermore, we seek to harness the strong amplification of scattered light at the plasmon resonance to induce near-field surface-initiated polymerization of pNIPAAm. We will report on the progress of our research, which aims to utilize these plasmonic effects as the basis for nanofabrication and sensing devices.

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