Abstract Submitted
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Large and Reversible Plasmon Tuning using Ultrathin Responsive Polymer film[1] SRIKANTH SINGAMANENI, SAIDE NERGIZ, Washington University in St. Louis — We demonstrate reversible linear and branched aggregation of gold nanoparticles adsorbed on an ultrathin responsive polymer ((poly(4-vinyl pyridine), P4VP) film. P4VP is a weak cationic polymer, which exhibits a reversible coil to globule transition with change in external pH. Atomic force microscopy revealed that in the coiled state (below the isoelectric point of the polymer) of the polymer chains, gold nanoparticles adsorbed on the polymer layer existed as primarily individual nanoparticles. On the other hand, lowering the pH caused the polymer chains to transition from coil to globule state, resulting in aggregation of the nanoparticles into linear and branched chains. Reversible aggregation of the nanoparticles results in a dramatic change in the optical properties of the metal nanostructures. Apart from the large redistribution of the intensity between the individual (530 nm) and coupled (650 nm) plasmon bands, the coupled plasmon band exhibits a shift of nearly 60 nm with change in external pH. The pH triggered aggregation of the nanoparticles and the dramatic change in the optical properties associated with the same can form an excellent platform for colorimetric sensing.

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