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Colloidal Quantum Dot Red-Shifting on Textured Metal Surfaces[1] CHRISTOPHER FERRI, University of California, Merced, School of Natural Sciences, ANTHONY GRIMES, University of California, Merced, School of Engineering, SAYANTANI GHOSH, University of California, Merced, School of Natural Sciences — We have studied the influence of textured metal surfaces on the emission of an ensemble of colloidal CdSe/ZnS core-shell quantum dots (QDs). The texture was generated by sputter coating a thin film of Gold Paladium (AuPd) on a thermoplastic Polydimethylsiloxane (PDMS) sheet. We used two separate protocols to generate two types of surfaces. We constrained some substrates such that they shrunk along only one planar dimension (uniaxial) while some were allowed to shrink along both planar directions (biaxial). The uniaxial substrates forced the metal to buckle along one dimension and the biaxial substrates buckled into a pseudorandom texture. We found that the QDs deposited on the biaxial substrates had a general red shift in the emission wavelength compared to their emission in solution, which also corresponded to a change in the temporal dynamics of the emission. The QDs on the uniaxial substrates showed a change in their temporal dynamics corresponding to plasmonic coupling, but no spectral shift. We hypothesize that the effects observed on the biaxial substrates are caused by the Franz-Keldysh effect.

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