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The Effect of Roughened Metallic Films on Colloidal Quantum Dot Energy Transfer[1] CHRISTOPHER FERRI, SOMNATH GHOSH, School of Natural Sciences, University of California, Merced, CA 95344, USA, BRENT RICH, MICHELLE KHINE, School of Engineering, University of California, Merced, CA 95344, USA, SAYANTANI GHOSH, School of Natural Sciences, University of California, Merced, CA 95344, USA — We investigate self-organized, roughened metallic surfaces as a platform for enhanced energy transfer between colloidal Cadmium Selenide (CdSe) quantum dots (QD). Pre-stressed thermoplastic substrates are sputter coated with gold palladium (AuPd) to create thin films. When heated, due to differing coefficients of thermal expansion of the plastic and metal, the AuPd film buckles to form micro- to nano-meter sized structures. QDs deposited on these self-organized metallic structures exhibit changes in their static and dynamic optical characteristics, which include spectral red-shift and multiple recombination decay rates. These observations can be attributed to a combination of enhanced electronic coupling between close-packed QDs and plasmonic coupling between the QD and metallic structures. We then leverage these properties to fabricate controlled, directional structures using this self-organized method which can be utilized as biochemical sensors.

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