The Photoelectrochemistry of Semicoductor Q-dot Modified Electrodes

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Colloidal sols of semiconductor Q-particles are prepared using organic moieties to arrest precipitation of the solid. Thus the as-formed particles are capped with organic species. Monolayer deposition of such a sol on to a conducting metal substrate yields an electrode possessing an array of metal-insulator-semiconductor junctions. Photoelectrochemical studies of such modified electrodes permit investigation of the rate of charge transfer across the insulator (1, 2).

The subsequent deposition of a second Q-particle layer yields an array containing both metal-insulator-semiconductor junctions and semiconductor-insulator-semiconductor junctions. If when forming the second layer a sol of a differing material to that of the first layer is employed the resultant semiconductor-insulator-semiconductor junction will be asymmetric. Spectroscopic photoelectrochemistry allows selected excitation of the nanoparticles in the layer and the influence of particle ordering on the rate of charge transfer to be studied.

This presentation will consider the preparation and characterization of asymmetric mulyilayers of Q-dots. The results of photoelectrochemical studies of the as-prepared systems will be reported. Particular emphasis will be given to studies of how nanoparticle layer ordering influences the rate of charge transfer.

1. S. G. Hickey and D. J. Riley, *Electrochimica Acta*, **45**, 3277 (2000).
2. D. J. Riley and E. J. Tull, *Journal of Electroanalytical Chemistry*, **504**, 45 (2001).