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Carrier Transport in Heterojunction Nanocrystals Under Strain
MARK SWEENEY, JOEL EAVES, Department of Chemistry and Biochemistry, University of Colorado, Boulder — We present a theory for carrier transport in semiconducting nanoscale heterostructures that emphasizes the effects of strain at the interface between two different crystal structures. An exactly solvable model shows that the interface region, or junction, acts as a scattering potential that facilitates charge separation. As a case study, we model a Type-II CdS/ZnSe heterostructure. After advancing a theory similar to that employed in model molecular conductance calculations, we calculate the electron and hole photocurrents and conductances, including non-linear effects, through the junction at steady-state.

Mark Sweeney
Dept of Chemistry and Biochemistry, University of Colorado, Boulder

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