Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Reducing Strain in Electrophoretically Deposited Nanocrystal Films by Post-Deposition Incorporation of Polymers THEODORE KRAMER, Department of Applied Physics and Applied Mathematics, Columbia University, STEFFEN JOCKUSCH, MICHAEL STEIGERWALD, NICHOLAS TURRO, Department of Chemistry, Columbia University, IRVING HERMAN, Department of Applied Physics and Applied Mathematics, Columbia University —
We have made dense nanoparticle-polymer films and investigated their mechanical properties using nano-indentation and other methods. Electrophoretically deposited (EPD) films of cadmium selenide nanocrystals were infiltrated with network-forming monomers and subsequently exposed to UV radiation in the presence of photoinitiators to facilitate polymerization of the monomer. This hybrid material exhibits the desirable photoluminecent properties of CdSe nanocrystals but does not fracture, as do thick electrphoretically grown nanoparticle films. This may be the result of effectively reducing strain in the films via void filling. The mechanical properties of these films differ from those of EPD films without the introduction of polymer, as seen by nanoindentation studies. These films offer the benefit of high particle density, as well as large film thickness ($>$ 2 micron), and may have useful applications in the area of flexible photovoltaic devices.

Theodore Kramer
Dept of Applied Physics and Applied Mathematics, Columbia University

Date submitted: 10 Dec 2008 Electronic form version 1.4