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Optical Properties of semiconducting nano-particles embedded in polymethyl methacrylate thin films and their applications in solar devices[1] RICHARD INMAN JR., GEORGIY SHCHERBATYUK, ANTHONY GRIMES, STEPHEN HORABIN, ROLAND WINSTON, SAYANTANI GHOSH, School of Natural Sciences, University of California, Merced, CA 95343 — We investigate the applicability of composite polymethyl-methacrylate (PMMA) and semiconducting nano-particle films in solar energy storage devices integrable in building architecture, particularly windows. Thin films are prepared at different concentrations and thicknesses and characterized both optically by static and time resolved spectroscopic techniques and electrically, by recording their photovoltaic (PV) response using silicon PV cells. We observe increased emission intensity, reduced self-absorption and alteration of recombination times in the semiconducting nanoparticles embedded in PMMA films. Additionally, we incorporate these films into planar solar concentrators and evaluate the power conversion efficiencies.

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Sayantani Ghosh
School of Natural Sciences, University of California, Merced, CA 95343

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