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[ SEM-340 ] Construction of CdSSe/GO multilayer thin films for hybrid solar cells

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Multilayer films of graphene oxide (GO) and cadmium selenide nanoparticles (CdSSe) with and without molecular functionalization linkers were prepared by sequential electrophoretic deposition and dip-coating techniques for applications in hybrid solar cells. CdSSe nanoparticles were prepared by glycerin mediated precipitation and later functionalized with 1,8-octanedithiol or 6-mercapto-1-hexanol. Electrophoretic deposition of graphene oxide was done from a commercial graphene oxide suspension or from surfactant-assisted mechanically exfoliated graphene onto fluorine-doped tin oxide or aluminium-doped zinc oxide substrates either commercial or prepared by spray pyrolysis. The obtained films were characterized by UV-Vis spectroscopy, scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS) and atomic force microscopy. The photocurrent response was also tested either making a solid device setting the film between two conductive substrates or in front of a sulfide/polysulfide electrolyte. The UV-Vis measurements showed that there is a decrease in the transmittance of the film compared to the transmittance of the substrate without deposition and this decrease varies depending on the molecular linker selected for the functionalization of nanoparticles. The SEM images show different integration of the nanoparticles also in function of the molecular linker.

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