Dithiol-capped CdSe nanoparticle films prepared by a soft chemistry method.

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Bulk heterojunction solar cells require adequate concentrations of the nanoparticulated n-type semiconductor within the polymeric matrix, but also a good interfacial interaction between them. Thiol and dithiol molecules have been devised as good candidates to provide interaction between the components as well as electrical conduction by tunnel effect, with the advantage of polar heads that would increase nanoparticle-nanoparticle structuring in a tridimensional net. To study the properties of a nanoparticle/dithiol system, CdSe nanoparticles were synthetized in glycerine solution from Cd^{2+} and Se^{2-} precursors in direct contact. Temperature and viscosity of the solution, reaction time and concentration of the precursors were varied. From absorbance measurements of the suspensions the CdSe particle size was estimated. The nanoparticles present hexagonal structure as determined by XRD. Nanoparticles were resuspended in ethanol and functionalized with 1,8-octanedithiol. The functionalized nanoparticles were measured by Raman and FTIR to assess the tridimensional structuring. Films were made by drop casting onto glass and ITO substrates and characterized by XRD, FTIR, Raman, SEM and optical transmittance.
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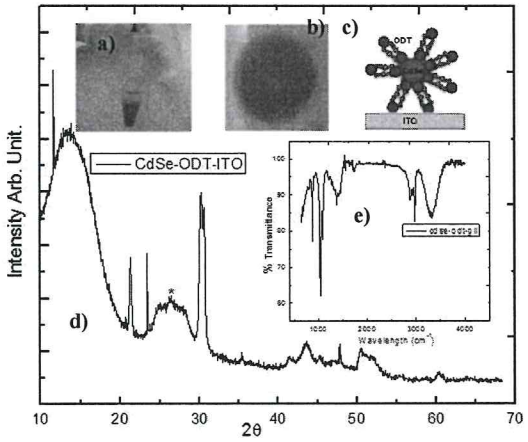

Fig. 1 a)Thiol-capped CdSe nanoparticles from glicerine solution. b)and c)Thiol-capped CdSe NP film onto ITO substrate. d) XRD from the same film. e) FTIR spectrum from the suspension in a).