

CdS, CdSe and PbS Nanostructured Thin Films Synthesized by Chemical Methods for Photovoltaic Applications

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Abstract - The chalcogenide semiconductors, like CdS, CdSe, CdTe, PbS, PbSe are of great interest for photovoltaic applications, in particular, due to the possibility to be part of multi-layered (tandem) photovoltaic converters. These materials are not expensive and can be produced by economic and ecologically friendly techniques like CBD (Chemical Bath Deposition) and its recent versions (SILAR - Successive Ionic Layer Adsorption and Reaction, and LACBD – Light Assisted Chemical Bath Deposition). Here we study the effects of nano-porosity that is an essential feature of these techniques; the corresponding quantum confinement affects the band gap value that can be used for its monitoring to optimize the device efficiency. In general, we conclude that the quantum confinement effects caused by nano-structuration of semiconductor thin films for photovoltaic converters improve the converter's parameters.

Keywords: Chalcogenide Semiconductors, Chemical Bath Deposition, Porosity, Nano Structuration, Quantum effects.