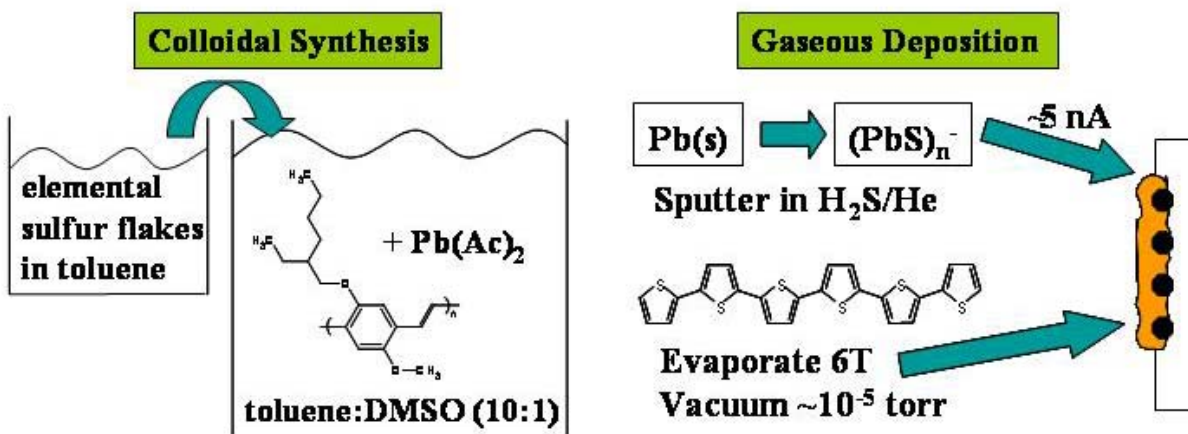


PHOTOEMISSION STUDIES OF LEAD SULFIDE NANOCRYSTALS IN ORGANIC FILMS FOR PHOTOVOLTAIC APPLICATIONS

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Lead sulfide (PbS) nanocrystals have shown potential for use in photovoltaics. PbS nanocrystals are grown into polymers or organic oligomer matrices to control the size and surface chemistry of the resulting nanocrystals. Transmission electron microscopy is used to determine the size distribution of PbS nanocrystals in organic films grown by either colloidal synthesis in polymer solutions or gaseous deposition using a cluster beam deposition source (see diagram below). Various techniques in photoemission spectroscopy are then applied to these PbS nanocrystal-organic films. X-ray photoelectron spectroscopy (XPS) confirms that PbS nanocrystals are present, but find little or no bonding between the PbS nanocrystals and the organic phase. Finally, core level binding energy shifts in XPS under simulated solar irradiation are used for contact-free evaluation of element-specific photovoltaic electrical response of these PbS nanocrystal-organic thin films.



The two methods of preparing PbS nanocrystals in organics for photovoltaic applications.