



## **Structural and optical properties of PbS-PVA, CdS-PVA and PbS-CdS-PVAnanocomposite films**

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**Abstract:**Freestanding nanocomposite films of PbS-PVA, CdS-PVA and PbS-CdS-PVA were synthesized using in-situ chemical method. All the nanocomposite films were characterized by XRD, SEM, FTIR and UV-Visible optical absorption studies. XRD patterns of all the nanocomposite films confirmed the cubic phase of PbS and CdS nanoparticles in PVA matrix. SEM images showed the mono-dispersion of PbS and CdS nanoparticles in PVA matrix. FTIR studies exhibited the shift in the peak position of functional groups of PVA matrix which indicates the interaction of nanoparticles and PVA polymer. UV-Visible optical absorption spectroscopy revealed the blue shift in absorption onset of PbS nanoparticles and CdS nanoparticles in PVA with the comparison of absorption onset of bulk PbS and CdS. The optical band gap energy of all the nanocomposite films were calculated and found to be 2.10, 2.84 and 2.22 eV for PbS-PVA, CdS-PVA and PbS-CdS-PVA films. The optical band gap energy of PbS-CdS-PVA nanocomposite film lies between the optical band gap energy of PbS/PVA and CdS/PVA films and is closer to the optical band gap energy of PbS/PVA film which indicates that the PbS nanoparticles are good candidates for the fabrication of future opto-electronic devices with the comparison of CdS nanoparticles.

**Keywords:**Nanocomposite films, Lead sulphide, Cadmium sulphide, Polyvinyl alcohol, Optical properties.

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