

# Fabrication and characterization of CdS film, nanowires and nanobelts grown by VPE

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The research is the structural and optical characteristics of the Cadmium Sulfide(CdS) film, nanowires and nanobelts grown on the Al<sub>2</sub>O<sub>3</sub> substrate using the vapor phase epitaxy method. The field-emission scanning electron microscopy(FE-SEM) were used to identify the shape of the surface of the nanostructures and x-ray diffraction(XRD) and transmission electron microscopy (TEM) were used to evaluate the structural characterisitcs. As a result, the XRD was confirmed the CdS peak and the substrate peak and TEM showed single crystals with wurtzite hexagonal structure on the nanostructures. As for the optical characteristic of the nanostructures, photoluminescence(PL) and micro-raman spectrum were measured. The PL measurements confirmed the emission peak related bound exciton to neutral donor(D<sup>0</sup>X) peak and free exciton(FX) peak. The micro-raman spectrum showed that the peak of the nanostructures were similar to the pure crystalline CdS peak and each peak were overtone of LO phonon of the hexagonal CdS of the longitudinal optical(LO) phonon mode. Therefore, it is confirmed that the CdS nanostructures grown in this research have superior crystallinity.

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