

# INTERNATIONAL VIRTUAL CONFERENCE ON RECENT TRENDS IN MATERIALS SCIENCE (ICRTMS 2021)



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**BANNARI AMMAN**  
**INSTITUTE OF TECHNOLOGY**  
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**SHAPE-CONTROLLED SYNTHESSES OF Fe DOPED PbS NANO-CRYSTALS USING HYDROTHERMAL METHOD**Revathi. M<sup>a</sup>, Preethi.M<sup>b</sup>, Ramakrishnan.S<sup>a</sup><sup>a</sup> Department of Physics, The Madura College, Madurai - 11<sup>b</sup> Department of Physics, E.M.G Yadava Womens College, Thiruppalai, Madurai – 14.  
[revathi.mayalagu@gmail.com](mailto:revathi.mayalagu@gmail.com) & 9952118294**Abstract**

The Fe doped PbS crystals in sub-micrometer/nanometer dimensions with various morphologies, such as cubes, dendrites, stars, and wires, were synthesized via a facile hydrothermal method [1]. a simple hydrothermal approach has been developed to prepare large-scale and shape-controlled PbS and Fe doped PbS sub micro-/nano-crystals with HMT capping agents at a high temperature of 200°C and by using thiourea as the S source [2]. The morphology, structure, and phase composition of PbS sub micro-/nano-structures were determined by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS) and UV. The influence of different capping agents on the growth of these PbS crystals was investigated and optimized. From the XRD, the identification of peaks indicates that the powder is crystalline. The cell parameters were calculated and compared with the reported values they matched well. The grown crystals have been subjected to various characterization studies. It was found that the <111> and <100S> directions were the main and controllable growing directions of PbS and Fe doped PbS crystals. From the SEM micrograph, it is observed that the processes and mechanisms of these PbS and Fe doped PbS crystals, especially the eight-and six-arm dendrites, were well studied and proposed. The UV-Vis absorption studies highlight the excellent transparency of the material in the range 300-800 nm. ED spectrum shows that the growing Nano-crystals having O, S, Fe, Pb elements. The formation mechanisms of these PbS crystals were proposed, which could give a proper explanation on the evolution of the crystal growth and may also pave the way to shape-controlled synthesis of other inorganic crystals with versatile complex structures via this facile hydrothermal method [3].

**Key words:** Crystal morphology, Hydrothermal crystal growth, Nanomaterials, Semiconducting lead compounds

**References**

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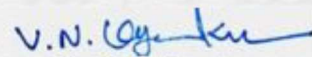
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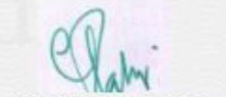
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