Material properties of semiconducting nanostructures synthesized using the chemical bath deposition method.

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Recently there has been a growing interest in controllable synthesis of low-dimensional semiconductors nanoscale materials with well-defined morphology due to their novel optical, electronic and potential applications in the fields of photonic and electronic devices**.** Many considerable efforts have been devoted to the development of synthesis methodologies for semiconducting nanostructures (nanocubes, nanorods, nanowires, nanobelts, nanotubes and nanostar). Most of the semiconductor nanostructure have been synthesized by traditional high temperature solid state method and again the final products were annealed at high temperatures which is energy consuming and difficult to control the particle size and morphology. In our case we have synthesized semiconducting nanostructures at low temperatures and annealed at ambient conditions. The project focuses on possibility of engineering band gap and influencing physical, chemical, and opto-electronic properties of ZnO(S) and PbS(S) by varying the dimensions of the system by changing the diameters and the composition of nanostructures. The ZnO(S) and PbS(S) nanostructures with various sizes, shapes and compositions was studied with different techniques i.e. photoluminescence (PL) spectroscopic (Figure 1 and 2).

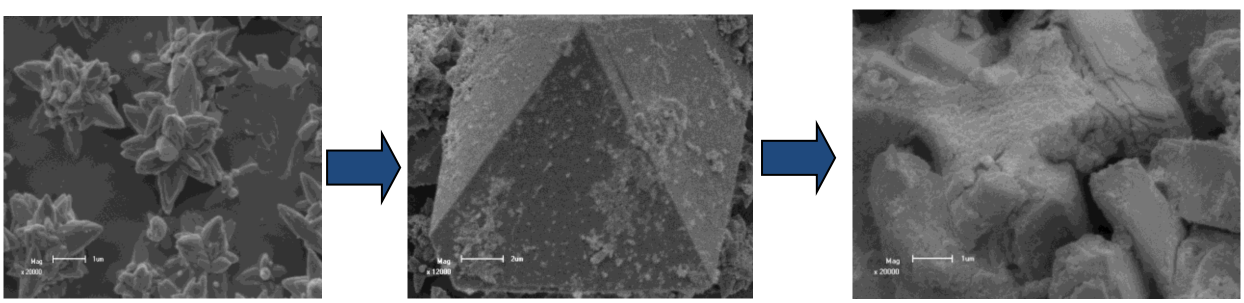

Figure 1: SEM images of (a) undoped ZnO, (b) ZnO:10 mol % $Ce^{3+}$and (c) ZnO:4 mol % Eu^{3+}, illustrating the effect of dopants on the ZnO structures.

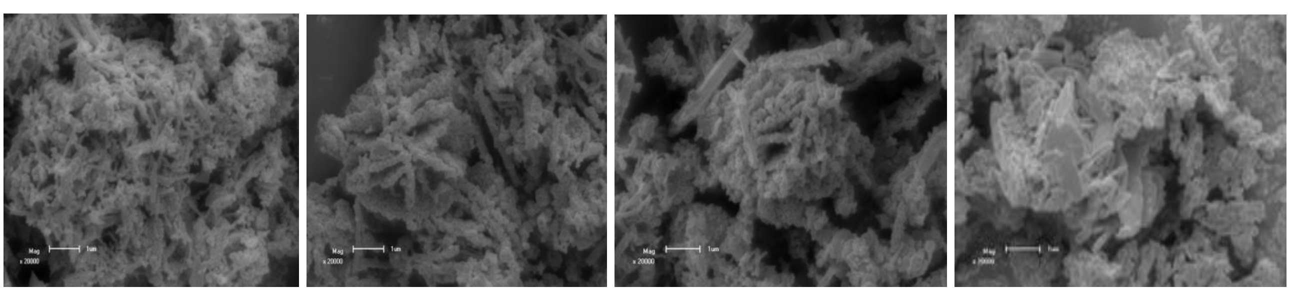

Figure 1: The SEM micrograph of PbS powders synthesized at the various temperatures: (a) 55 $^{\circ}$C, (b) 65 $^{\circ}$C, (c) 70 $^{\circ}$C and (d) 80 $^{\circ}$C but at constant molar concentration of lead acetate.