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Synthesis and characterization of reproducible stoichiometry of cobalt sulfide nanoparticles using sulphur containing single-source precursors

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<p>Cobalt sulphide nanoparticles are one of the most complex and challenging particles to synthesize due to strongly reducibility of the cobalt ion and the oxidizable nature of the sulphide ion. Cobalt sulphide therefore exist in various phases with different compositions including Co4S3, Co9S8, CoS, Co1-xS, Co3S4, Co2S3 and CoS2. Herein, we describe the synthesis of CoxSy nanoparticles; furthermore we interrogate the influence of the reaction conditions on the structure and optical properties of the nanoparticles. CoxSy nanoparticles were synthesized by thermolysis of N, N, N´, N´-tetramethylthiuram disulphide cobalt (II) complex in the presence of stabilizing agent Hexadecylamine (HDA). The advantage of this method is that the bond between the cobalt and sulphur atoms already exist, therefore decomposition of the complex at write conditions will result in the formation of CoxSy nanoparticles. The cobalt sulfide nanoparticles were prepared by varying concentration from the range 5.0 mg to 5.0 g of the CoCl2[(CH3)2NCS2S2CN(CH3)2]2 complex at 130 ℃ temperature. The effect of temperature was also investigated by varying the temperature from 80 to 250 ℃. The nanoparticles were characterised by a combination of absorption spectroscopy, photoluminescence (PL), X-ray diffractometry (XRD) and transmission electron microscopy (TEM).

Level (Hons, MSc,
   PhD, other)?

M-Tech

Consider for a student
   award (Yes / No)?

Yes

Would you like to <br> submit a short paper <br> for the Conference
 Proceedings (Yes / No)?

Yes

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