



Contribution ID: 102

Type: Poster Presentation

Synthesis and characterization of binary phase NiS nanostructures

Wednesday, 9 July 2014 17:10 (1h 50m)

Abstract content ** **; (Max 300 words)**
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Nickel and sulphur form various polymorphs which include NiS, NiS₂, Ni₃S₄, Ni₉S₈, Ni₇S₈ and Ni₃S₂. Nickel monosulphide (NiS) exhibit hexagonal and rhomboherdal phases which have interesting electrical and catalytic properties. As such, NiS has been studied for potential applications in lithium ion batteries, hydrodesulfurization catalyst and in IR detectors. NiS is one of the materials that show a metal to insulator transition at approximately 260 K. Soft chemical routes are being employed extensively to synthesize inorganic nanomaterials. Methods that have been used to make NiS nanomaterials include slow precipitation method, single source precursor route and microwave-assisted hydrothermal route. In this paper we report NiS nanostructures that were synthesized using a microwave-assisted hydrothermal technique. Solvent type as well as NiS precursors were varied in order to investigate their effect on the various structures as well as phase distribution of Ni:S at 1:1 ratio. Both XRD and HR-TEM techniques were employed to investigate the phase and the size distribution of the products. Hexagonal nano-size platelets, nano-spheres, nano-sheets, nano-wires and nano-rods were obtained when different precursors and/or solvents were used

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PhD

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Dr B Mwakikunga

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Yes

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Session Classification: Poster2

Track Classification: Track A - Division for Physics of Condensed Matter and Materials