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Bi₂Te₃纳米颗粒和纳米线的溶剂热合成及组织特征

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摘要: 分别以吡啶、无水乙醇为反应介质, 以NaBH₄为还原剂, 采用溶剂热合成方法, 在150℃下反应24h制备了平均晶粒尺寸为15-20nm的Bi₂Te₃纳米粒子。采用相同的合成方法, 以去离子水为反应介质, 合成了直径为30-80nm, 长径比大于100的Bi₂Te₃纳米线。XRD和TEM分析表明, 随着溶剂介电常数和极性增加, 所生成产物的物相纯度、结晶度增高, 晶粒尺寸增大。

关键词: Bi₂Te₃; 溶剂热合成; 纳米颗粒; 纳米线

Solvothermal synthesis and characterizations of Bi₂Te₃ nano-particles and nanowires

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Abstract: Bi₂Te₃ nano-particles with the average sizes of 15~20nm were prepared by solvothermal synthesis at 150°C for 24h using pyridine or ethanol as the reaction medium and NaBH₄ as the reductant. Bi₂Te₃ nanowires with diameters less than 100nm and aspect ratios larger than 100 were solvothermally synthesized in distilled water by similar method. XRD and TEM analyses show that the phase purity, crystallization and particle sizes of synthesized powders increase with the increase of the dielectric constant and polarity of the solvent.

Key words: Bi₂Te₃; solvothermal synthesis; nano-particles; nanowire

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