

研究论文

多元醇法制备Cu₂O/CNTs复合材料的研究

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摘要 以Cu(CH₃COO)₂·H₂O和经硝酸处理的CNTs作为原料, 采用多元醇法成功合成了纳米氧化亚铜均布于碳纳米管表面的复合光催化剂. 用透射电镜(TEM), 高分辨透射电镜(HRTEM), X射线粉末衍射(XRD)对样品进行了表征, 测试结果表明大小为2~5 nm的氧化亚铜纳米颗粒均匀分散于碳纳米管的表面.

讨论了反应条件对Cu₂O在CNTs上负载效果的影响并就多元醇法合成Cu₂O/CNTs复合材料的反应机理作了初步探讨.

关键词 [纳米氧化亚铜](#) [碳纳米管](#) [多元醇法](#) [反应机理](#)

分类号

Synthesis of Cu₂O/CNTs Composite by Polyol Method

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Abstract Homogeneous cuprous oxide nanoparticles dotted on the surface of multiwalled carbon nanotubes (CNTs) were successfully synthesized with Cu(CH₃COO)₂·H₂O/treated CNTs precursors by polyol method. The samples were determined by means of X-ray diffraction (XRD), transmission electron microscopy (TEM) and high-resolution transmission electron microscopy (HRTEM). The effects of various experimental conditions on the obtained composites were investigated as well. Finally, possible deposition mechanism of cuprous oxide particles on the surface of CNTs was proposed. The results indicate that there are cuprous oxide nanoparticles with the diameter of 2~5 nm dotted on the surface of CNTs homogeneously by controlling the molar ratio of copper acetate to carbon nanotubes to be 1: 2, the pretreatment time for 6 h and the reaction time for 2 h. The possible mechanism is that through stirring, copper acetate may be adsorbed on the surface of carbon nanotubes by the strong interaction between copper ion and the functionalized group such as carboxyl and hydroxyl. Then, in polyol solvent, copper acetate was hydrolyzed to CuO and copper(II) ion reduced to copper (I) ion by polyol or acetate ion.

Key words [cuprous oxide nanoparticle](#) [carbon nanotube](#) [polyol method](#) [deposition mechanism](#)

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