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自悬浮定向流法制备纳米Cu粉的微结构和性能表征

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摘要: 采用自悬浮定向流法制备纳米Cu粉; 用透射电镜、X射线衍射、紫外-可见光吸收光谱、差示扫描量热、热重法和X射线光电子能谱分析对纳米Cu微晶的形貌、粒度、结构和性能进行研究。研究表明: 在体积分数为10% He和90% Ar混合气流中和在Ar气流中制备的纳米Cu粒子形貌呈球形, 平均粒度分别约为45和60 nm; 在590 nm左右有一个很强的吸收峰; 纳米Cu粒子表面Cu和O元素的摩尔比为94.88?5.12, 有少量氧化亚铜和氧化铜的混合物存在, 但在其表面未发现Ar和N。

关键字: 纳米铜粉; 微结构; 自悬浮定向流法; X射线光电子能谱

Microstructure and properties of nano-copper powders prepared by flow-levitation method

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Abstract: Nano-copper powders were prepared by flow-levitation method. The morphologies, granularities, structure and properties of nano-Cu particles were investigated by means of transmission electron microscopy, X-ray diffractometry, UV-Visible absorption spectroscopy, thermal analysis techniques and X-ray photoelectron spectroscopy. The results show that the mean granularity of almost-spherical nano-Cu particles are about 45 nm and 60 nm prepared in 10% He and 90% Ar and in Ar, respectively. The maximum specific absorption appears at wavelength of 590 nm. On the surface of the nano-Cu particles, the mole ratio of Cu to O is about 94.88?5.12, and there is a small amount of mixture of Cu₂O and CuO, but there

are no elements of Ar and N in nano-Cu particles by X-ray photoelectron spectroscopy.

Key words: nano Cu powders; microstructure; flow-levitation method; X-ray photoelectron spectroscopy

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