

NOTES

SnO₂一维纳米结构的合成与表征

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摘要 将自制的SnO₂粉末与等量的石墨粉研磨, 在管式炉中加热到900℃, 在有金催化剂的硅片上合成了大量的单晶SnO₂纳米线。除了平滑的纳米线, 还发现了一些特殊结构的纳米线。对合成的产物利用高分辨透射电镜、X射线衍射、激光拉曼光谱等研究手段进行了分析, 结果表明: 单根的SnO₂纳米线是金红石结构的单晶, 直径约30-120 nm, 长度达几十微米。另外, 还对生长SnO₂纳米线的反应进行了研究与讨论, 并探讨了SnO₂纳米线一种可能的生长机理。

关键词 [SnO₂纳米线](#), [化学气相运输方法](#), [生长机理](#)

分类号

Synthesis and Characterization of SnO₂ One-dimensional Nanostructures

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Abstract Single-crystalline SnO₂ nanowires have been successfully prepared in large scale on Au-coated silicon substrate by heating the mixture of self-made high-purity SnO₂ powders and graphite powders at 900 °C. Besides the line type nanowires some more features were observed. The products were characterized by means of X-ray diffraction (XRD), field emission scanning electron microscopy (FE-SEM), transmission electron microscopy (TEM), high-resolution transmission electron microscopy (HRTEM), selected area electron diffraction (SAED) and Raman spectrum techniques. The results indicate that the tin dioxide nanowires have a rutile structure with diameters ranging from 30 to 120 nm and lengths up to several tens of micrometers. The possible mechanism of the growth and reaction for the nanowires was also discussed.

Key words [SnO₂ nanowire](#) [chemical vapor transport method](#) [growth mechanism](#)

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