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结构材料及核材料性能

多晶硅薄膜等离子体增强化学气相沉积低温制备工艺

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摘要 采用电子回旋共振等离子增强化学气相沉积（ECR-PECVD）方法，以SiH_4和H_2为气源，在普通玻璃衬底上沉积多晶硅薄膜。利用XRD、Raman光谱和TEM研究了衬底温度、氢气流量和微波功率对多晶硅薄膜结构的影响。结果表明，制得的多晶硅薄膜多以（220）取向择优生长，少数条件下会呈现（111）择优取向。当衬底温度为300 ℃、H2流速为25 mL/min、微波功率为600 W时，多晶硅薄膜结晶状态最好，且呈最佳的（220）取向。

关键词 电子回旋共振等离子体增强化学气相沉积；多晶硅薄膜；低温生长

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Preparation of Polycrystalline Silicon Films by Plasma-Enhanced

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Abstract Using SiH4and H2 as source gases, the polycrystalline silicon thin films were prepared on glass by electron cyclotron resonance plasma enhanced chemical vapor deposition (ECR-PECVD) technique. The effects of the deposition parameters, such as the substrate temperature, the flow ratio of H2 and the microwave power, were investigated by XRD, Raman spectrum and TEM. The results show that most of the poly-Si films have a (220) preferential orientation. While in some cases, (111) preferentially oriented silicon films are obtained. The films with the optimum crystal state can be deposited at substrate temperature of 300 ℃, hydrogen flow ratio of 25 mL/min , and microwave power of 600 W.

Key words electron cyclotron resonance plasma-enhanced chemical vapor deposition polycrystalline silicon film low temperature growth

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