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研究论文

快速热退火对多层Ge量子点晶体质量的影响

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摘要： 使用超高真空化学气相淀积(UHV/CVD)设备在Si衬底上生长多层Ge量子点，用双晶X射线衍射(DCXRD)、拉曼光谱(Raman)等手段表征在不同条件下快速热退火的Ge量子点材料的组分、应力等特性，研究了快速热退火对多层Ge量子点晶体质量的影响。结果表明：随着退火温度的升高，量子点中Ge的组分下降，量子点应变的弛豫程度加剧。在1000℃退火20 s后，量子点材料已经完全弛豫。

关键词： 无机非金属材料 快速热退火 Ge量子点 双晶X射线衍射 拉曼光谱

Influence of Rapid Thermal Annealing on Ge Quantum Dots Crystal Quality

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Abstract: Multilayers of Ge quantum dots were grown on Si substrate by UHV/CVD. The Ge composition and strain relaxation in Ge dots by a rapid thermal annealing (RTA) treatment at different conditions were characterized by DCXRD and Raman spectrum, and the influence of rapid thermal annealing on Ge quantum dots crystal quality was investigated. The results show that the Ge composition decreased and strain relaxation in Ge dots increased at higher annealing temperature. The Ge dots were almost completely strain relaxed by RTA treatment at 1000^{0}C for 20 s.

Keywords: inorganic non-metallic materials rapid thermal annealing(RTA) Ge quantum dots DCXRD Raman spectrum

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