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材料合成及性能

电子束泵浦氧化锌基量子阱的斯塔克效应

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摘要： 在不同功率密度的电子束泵浦条件下,对$ZnO/Zn_{0.85}Mg_{0.15}O$非对称双量子阱的荧光光谱进行了研究,并采用蒙特卡罗仿真模拟对测试结果进行了分析。模拟的结果和实验结果高度吻合。观测到了不随穿透深度变化的阱区发光峰红移,证明表面电荷积累引起了量子限域斯塔克效应。

关键词： ZnO 量子阱 电子束泵浦 量子限域斯塔克效应

Quantum-confined Stark Effects in Cathodoluminescence of $ZnO/Zn_{0.85}Mg_{0.15}O$ Quantum Wells Pumped by Large Beam Current

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Abstract: Cathodoluminescence (CL) of $ZnO/Zn_{0.85}Mg_{0.15}O$ asymmetric double-quantum-well structure under various excitation conditions was studied. A Monte Carlo simulation CL generation profiles was adopted. An excellent agreement between the experimental CL emissions and theoretically simulations was observed. A marked red shift of the emission peak was clearly observed under large beam current excitation, which was attributed to quantum-confined Stark effect caused by electron accumulation on the sample surface.

Keywords: ZnO quantum wells electron beam pumped quantum-confined Stark effect

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