化学学报 2001 59 (10): 1587-1591 ISSN: 0567-7351 CN: 31-1320/06

多孔硅于甲酸-甲酸钠溶液阳极偏压下的电致发光研究

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收稿日期 修回日期 网络版发布日期 接受日期

摘要 用荧光分光光度法现场监测了多孔硅于甲酸-甲酸钠溶液阳极偏压下的电致发光行为。发现该体系的电致发光峰值随着阳极偏压增大而发生蓝移；发光峰能量值与阳极偏压呈良好的线性关系，其斜率与多孔硅在阴极偏压下电致发光的结果一致。扫描探针技术研究表明：多孔硅的表面形貌明显地影响其发光性质。提出了多孔硅在甲酸-甲酸钠溶液中阳极偏压下的电致发光与多孔硅表面的Si-H键的氧化作用有关的发光机理。发现了多孔硅于甲酸-甲酸钠溶液中在阳极偏压下电压调制的可见光发射行为，并用量子限制效应对该现象进行了解释。

关键词 硅 甲酸 甲酸钠 电致发光 电势偏压 化学发光

分类号 0644

Studies on the electroluminescence of porous silicon in formic acid- sodium formate solution at positive biases

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Abstract The electroluminescence of porous silicon in formic acid and sodium formate solution at positive biases was investigated by luminescence spectrometer. In was discoved that the blue shift for peak wave lengths of electroluminescence occurred when the positive bias was increased. The emitted photon energy depended linearly on the positive biases, the slope of which was in agreement with that of electroluminescence at negatively biased condition. It was shown by scanning probe technique that there was close relation between luminescence properties of porous silicon and its surfac images. It was suggested that the electroluminescence of porous silicon in the solution of formic acid and sodium formate stemmed from the oxidation if Si-H bonds on the surface of porous silicon. The voltage tunable emitting for porous silicon in formic acid - sodium formate solution at positive biases was revealed, which could be explained by the quantum confinement effect.

Key words SILICON FORMIC ACID SODIUM FORMATE ELECTROLUMINESCENCE CHEMILUMINESSENCE

DOI:

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