



材料合成及性能

Yb³⁺/Er³⁺共掺BaGd₂O₄荧光粉的制备及其上转换发光性质

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摘要： 采用溶胶-凝胶法制备了Yb³⁺/Er³⁺共掺杂BaGd₂O₄上转换荧光粉。研究了退火温度对BaGd₂O₄晶体结构的影响，以及Yb³⁺/Er³⁺共掺杂的BaGd₂O₄荧光粉在971 nm LED激发下，激发密度与上转换发射光功率及效率的关系。研究表明，尽管BaGd₂O₄与目前报道效率最高的Yb³⁺/Er³⁺共掺杂BaGd₂ZnO₅基质的最高声子能量相同，但光-光转换效率却相差82倍，极量子效率相差7.8倍。结论认为，在声子能量不是很高的情况下，材料结构是影响上转换效率的主要因素。

关键词： 上转换发光 BaGd₂O₄ 效率 Yb³⁺/Er³⁺

Synthesis and Characterization of Up-conversion Luminescence Material Er³⁺/Yb³⁺ Co-doped BaGd₂O₄

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Abstract: Yb³⁺/Er³⁺ co-doped BaGd₂O₄ phosphors were prepared by the sol-gel method. The influence of annealing temperature on BaGd₂O₄ crystal structure was investigated. Under 971 nm excitation, the dependence of the emission power and the up-conversion efficiency on the excitation density was studied. The obtained data show that the light conversion and absolute quantum efficiency of BaGd₂O₄:Yb³⁺,Er³⁺ are 82 and 7.8 times smaller than that of BaGd₂ZnO₅:Yb³⁺,Er³⁺, respectively. But the phonon energy of BaGd₂O₄ is almost the same with that of BaGd₂ZnO₅:Yb³⁺,Er³⁺ which possesses the highest efficiency as ever reported. So, we can conclude that the material structure is the main influencing factor on the up-conversion efficiency when the phonon energy of the host is not very high.

Keywords: up-conversion BaGd₂O₄ efficiency Yb³⁺/Er³⁺

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