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材料合成及性能

水热法合成$LuVO_4$：Eu^{3+}红色荧光粉及其光谱性能研究

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摘要： 利用水热法经过或未经过进一步热处理合成$LuVO_4$:Eu^{3+}亚微米(或纳米)荧光粉。通过X射线粉末衍射、扫描电子显微镜、光致发光光谱、衰减曲线对所得的荧光粉进行性能表征。$LuVO_4$:Eu^{3+}荧光粉的激发光谱在275 nm的吸收峰主要来源于Eu→O电荷跃迁,Eu^{3+} 的f-f跃迁在紫外和可见光区域有395 nm和 466 nm两个强峰。从最佳掺杂摩尔分数的$LuVO_4$:8%Eu^{3+}荧光粉中观察到Eu^{3+}在619 nm 处强烈的发射峰对应于$^5D_0$→$^7F_2$跃迁。实验结果表明$LuVO_4$:Eu^{3+}可作为潜在的红色荧光粉应用于显示与照明领域。

关键词： 光学材料 $LuVO_4$：Eu^{3+} 水热法 发光

Hydrothermal Synthesis and Luminescence Properties of Eu^{3+}-activated $LuVO_4$ Red Phosphors

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Abstract: $LuVO_4$:Eu^{3+} nano-(or submicron-) phosphors have been prepared by hydrothermal method without (or with) further heat treatment. The properties of the resulting phosphors are characterized by X-ray diffraction, scanning electron microscope, photoluminescence spectra and decay curve. The excitation spectra of $LuVO_4$:Eu^{3+} phosphors are mainly attributed to Eu→O charge-transfer band at about 275 nm as well as some sharp lines of Eu^{3+} f-f transitions in near-UV and visible regions with two strong peaks at 395 and 466 nm, respectively. Under the 275 nm excitation, intense red emission peak at 619 nm corresponding to $^5D_0$→$^7F_2$ transition of Eu^{3+} is observed for $LuVO_4$:8%Eu^{3+} phosphors as the optimal doping mole fraction. The luminescence properties suggest that $LuVO_4$:Eu^{3+} phosphor may be applied as a potential red phosphor candidate for lighting and displays.

Keywords: optical materials $LuVO_4$：Eu^{3+} hydrothermal method luminescence
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