

论文

LED用La₂(WO₄)₃:Eu³⁺+红色荧光粉合成及光谱性能

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摘要:

采用水热法并进行热处理成功合成了Eu³⁺掺杂La₂(WO₄)₃红色荧光粉.通过粉末X射线衍射、扫描电子显微镜,以及能谱来表征荧光粉的晶体结构、颗粒大小、形貌及成分|用激发光谱和发射光谱以及荧光衰减曲线来表征荧光粉的荧光性能.X射线衍射分析确认了水热的前驱体和后期热处理的样品主要相分别为三斜晶系的La₂W₂O₉和单斜晶系的La₂(WO₄)₃.激发光谱表明La₂(WO₄)₃:Eu³⁺+荧光粉样品在395 nm处有一个最强的吸收峰,与紫外InGaN LED芯片发射波长相匹配|而且La₂-xEu_x(WO₄)₃荧光粉在395 nm激发下有强红光发射.因此,La₂-xEu_x(WO₄)₃荧光粉有望成为新一代白光LED用的红色荧光粉.

关键词: 发光二极管 水热合成 红色荧光粉 光谱分析

Synthesis and Luminescence Properties of La₂(WO₄)₃:Eu³⁺ red Phosphors as LED Application

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Abstract:

Eu³⁺-doped La₂(WO₄)₃ phosphors were synthesized by a hydrothermal method with further heat treatment.X-ray diffraction (XRD),field-emission scanning electron microscopy (SEM),and energy dispersive spectrometer (EDS) were used to characterize the resulting samples of crystal phase structure,particle size and morphology and composition.Photoluminescence excitation and emission spectra and decay curve were used to characterize the fluorescence properties of phosphors.XRD analysis confirmed that the precursors and as-prepared sample (900 °C for 2 h) were α-La₂W₂O₉ with triclinic structure and La₂(WO₄)₃ with monoclinic structure,respectively.The results show that La₂(WO₄)₃:Eu phosphor exhibits intensive red emission under 395 nm excitation.The strongest line (395 nm) in excitation spectra of these phosphors matches with the output wavelength of UV InGaN-based light-emitting diodes (LEDs) chip.Hence,it is considered to be a new promising phosphor for generating white light devices.

Keywords: Light Emitting Diode(LED) Hydrothermal synthesis Red phosphor Spectral analysis

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