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### 材料合成及性能

#### 铈掺杂硫酸氧钒红色荧光粉的制备及发光性能

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摘要：采用共结晶-高温煅烧法和共混合-高温煅烧法合成了 $Gd_{2-x}O_2SO_4 \cdot xEu^{3+}$ 系列荧光粉,用XRD、SEM和荧光光谱分析技术对样品的晶体结构、表面形貌及发光性能进行表征。结果表明:两种方法在950℃合成的 $Gd_{2-x}O_2SO_4 \cdot xEu^{3+}$ 系列荧光粉都具有单一物相,在紫外波长激发下都发出618 nm红光。然而,发光强度和粒子特性存在差异,共结晶-高温煅烧法比共混合-高温煅烧法合成的样品显示出更强的红光和较好的粒子形貌。最佳的铈掺杂量 $x=0.10$ ,最佳煅烧温度为950℃。荧光粉的粒度在500 nm左右。

关键词：硫酸氧钒 共结晶 荧光粉 制备

#### Preparation and Luminous Property of $Gd_{2-x}O_2SO_4 \cdot xEu^{3+}$ Red Phosphors

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Abstract: A series of fluorescent powders of  $Gd_{2-x}O_2SO_4 \cdot xEu^{3+}$  have been synthesized by two methods: the co-crystallization followed by calcinations (CCC) method and the co-mixture followed by calcinations (CMC) method. The as-prepared phosphors were examined by means of X-ray diffraction (XRD), scanning electron spectroscopy (SEM) and photoluminescence spectrometer (PLS). The results show that  $Gd_{2-x}O_2SO_4 \cdot xEu^{3+}$  phosphors with single crystalline phase have been successfully prepared with both methods at calcinations temperature around 950℃, and emit red light at 618 nm under ultraviolet excitation. However, the emission strength and particle characterization are different. It is proved that the phosphors prepared by CCC method have stronger red emission and better morphology of the particles than that by CMC method. The optimal Eu doping content and calcinations temperature are determined to be  $x=0.1$  and 950℃. The particle size of as-synthesized phosphors is around 500 nm.

Keywords: gadolinium oxide sulfate co-crystallization phosphor preparation

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