

$Y_2O_2S:0.03Eu,0.03Ti$ 的长余辉特性及Ti向 Eu^{3+} 的余辉传能机制

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收稿日期 2005-4-1 修回日期 2005-5-23 网络版发布日期 接受日期

摘要 采用高温还原法合成了Eu, Ti共激活橙红色 Y_2O_2S 长余辉发光材料,并测量 $Y_2O_2S:0.03Eu,0.03Ti$ 磷光体的荧光光谱,余辉分辨和余辉衰减曲线谱.实验结果表明, $Y_2O_2S:0.03Eu,0.03Ti$ 磷光体的发射谱由一系列 Eu^{3+} 离子内部能级跃迁的尖峰组成;余辉分辨谱则不同,由一个主峰位于565nm的宽发射带和一系列波长范围位于500nm以上的窄发射带两种峰形组成,可分别归为Ti离子的宽带余辉发射和三价 Eu^{3+} 的线状余辉发射.分析认为,样品中存在Ti余辉发射向 Eu^{3+} 内部能级间产生选择性的余辉传能机制,从而导致 $Y_2O_2S:0.03Ti,0.03Eu$ 磷光体中同时出现两种发光中心离子的余辉分辨谱现象.

关键词 [长余辉](#) [传能](#) [磷光体](#) [发光](#) [稀土](#)

分类号

Afterglow and Energy Transfer from Ti to Eu^{3+} in $Y_2O_2S:0.03Eu,0.03Ti$ Phosphor

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Abstract

A new kind of orange-red long afterglow Eu and Ti co-doped Y_2O_2S phosphor was synthesized via a traditional solid state reaction method under reducing atmosphere of CO. The photoluminescence spectrum, afterglow time-resumed spectrum and afterglow decay curve of the $Y_2O_2S:0.03Ti,0.03Eu$ phosphors were measured. The result shows that the emission spectrum of $Y_2O_2S:0.03Ti,0.03Eu$ consists of a group of narrow linear peaks from charge transmission of Eu^{3+} . The orange-red afterglow was observed in present phosphors with two different luminescence centers: a broad yellow emission band around 565nm related to Ti emission and a group of narrow peaks of Eu^{3+} emission in the longer wavelength range. The afterglow mechanism of Eu^{3+} emission was suggested to come from the energy transfer process from Ti afterglow emission to Eu ions, and result in two different afterglow centers of Ti afterglow emission and Eu^{3+} afterglow emission in present $Y_2O_2S:0.03Ti,0.03Eu$ phosphor.

Key words [afterglow](#) [energy transfer](#) [phosphor](#) [photoluminescence](#) [rare earth](#)

DOI:

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