

## BaGdB~9O~16中Dy<sup>3+</sup>的发光和Ce<sup>3+</sup>, Gd<sup>3+</sup>对Dy<sup>3+</sup>的能量传递

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收稿日期 修回日期 网络版发布日期 接受日期

**摘要** 我们研究了在紫外光(UV)激发下, Dy<sup>3+</sup>单掺杂和Ce<sup>3+</sup>, Dy<sup>3+</sup>共掺杂的BaGdB~9O~16的发射光谱、激发光谱及发光强度随组成变化的规律性,

发现Ce<sup>3+</sup>, Gd<sup>3+</sup>均对Dy<sup>3+</sup>的发光起敏化作用。Ce<sup>3+</sup>吸收的能量大部分直接传递给Dy<sup>3+</sup>,

小部分以Ce<sup>3+</sup>→Gd<sup>3+</sup>→(Gd<sup>3+</sup>)

~n→Dy<sup>3+</sup>形式传递给Dy<sup>3+</sup>。Ce<sup>3+</sup>→Dy<sup>3+</sup>能量传递和Dy<sup>3+</sup>自身浓度猝灭机理分别为电偶极-

电偶极和电偶极-电四级相互作用。

**关键词** [硼酸盐](#) [钡化合物](#) [掺杂](#) [能量传递](#) [镱](#) [镱化合物](#) [猝灭](#) [紫外光](#)

分类号 [0644](#)

## Luminescence and energy transfer of Ce<sup>3+</sup>, Gd<sup>3+</sup> and Dy<sup>3+</sup> in BaGdB~9O~16

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**Abstract** The photoluminescence of Dy<sup>3+</sup> singly doped BaGdB9O16 samples or Ce<sup>3+</sup> and Dy<sup>3+</sup> co-doped BaGdB9O16 samples excited by UV light and the dependence of Ce<sup>3+</sup> and Dy<sup>3+</sup> luminescent intensities on these compns. were studied. The results indicate that both Ce<sup>3+</sup> and Gd<sup>3+</sup> can sensitize the luminescence of Dy<sup>3+</sup>; the energy of Dy<sup>3+</sup> emission originated mostly from the Ce<sup>3+</sup> ion, which absorbs the excitation energy by its f-d transition. The other parts of the energy are derived from the Gd<sup>3+</sup> ion. The mechanism of the energy transfer from Ce<sup>3+</sup> to Dy<sup>3+</sup> was studied. There is a resonant transfer elec. dipole-dipole interaction. The dependence is discussed of the luminescent intensities on the concentration of Dy<sup>3+</sup> in BaGdB9O16: Dy<sup>3+</sup> under the excitation at 348 nm. The mechanism of concentration self-quenching of Dy<sup>3+</sup> is an elec. dipole-quadrupole interaction.

**Key words** [BORATES](#) [BARIUM COMPOUND](#) [DOPE](#) [ENERGY TRANSFER](#) [DYSPROSIUM](#) [CADMIUM COMPOUNDS](#) [QUENCHING](#) [UV-LIGHT](#)

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