Photoluminescence characteristics of Sm^{3+}-doped $LnBWO_6$ (Ln = La, Gd and Y) as new orange-red phosphors

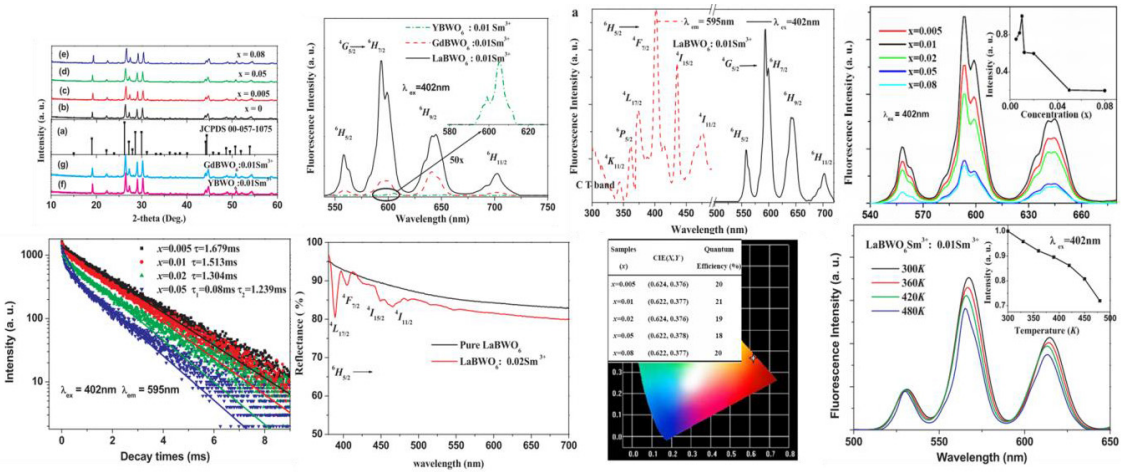
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二. 成果简介：

A series of Sm^{3+}-doped $LnBWO_6$ (Ln = La, Gd and Y) phosphors with orange-red light emitting in pure phase were prepared by high temperature solid-state process. The crystal structure, photoluminescence properties, decay lifetimes and thermal stability properties of those as-prepared samples were investigated. Those phosphors can be efficiently excited by near-UV and blue light and emitted orange-red luminescence with color coordinates (0.622, 0.377). Among those $LnBWO_6$ (Ln = La, Gd and Y) hosts, the emission intensities of Sm^{3+}-doped $LaBWO_6$ are the strongest ones. The optimum doping concentration and critical energy transfer distance of Sm^{3+} ions in $LaBWO_6$ were determined. The fluorescence concentration quenching mechanism was attributed to the dipole-dipole interaction between the Sm^{3+} ions. The fluorescent thermal quenching studies showed Sm^{3+} doped $LaBWO_6$ had high thermal-stable properties. The present work suggested that Sm^{3+}-doped $LnBWO_6$ (Ln = La, Gd and Y) as orange-red phosphors exhibited potential application in white LED.

三. 主要研究内容及创新点：

a series of near-UV and blue excited orange-red emitting $La_{1-x}BWO_6$: xSm^{3+} (x = 0–0.08) and $Ln_{1-x}BWO_6$: xSm^{3+} (x = 0–0.05, Ln = Gd and Y) phosphors have been prepared, and their spectral properties have been investigated. It be found that Sm^{3+}-doped $LnBWO_6$ (Ln = La, Gd and Y) phosphors emitted orange-red light when excited efficiently by nearUV and blue LED chips. The fluorescence concentration quenching mechanism between Sm^{3+} ions in $LaBWO_6$ was demonstrated to be dipole-dipole interaction. The decay curves of representative Sm^{3+}- doped $LaBWO_6$ samples were conducted. Thermal stability studies disclosed that Sm^{3+}-doped $LaBWO_6$ phosphors showed excellent stability.



XRD and optical properties of Sm3+-doped LnBWO6 phosphors

四. 主要研究成果及应用情况

发表 SCI 论文 1 篇：Photoluminescence characteristics of Sm^{3+}-doped $LnBWO_6$ (Ln = La, Gd and Y) as new orange-red phosphors

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