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Synthesis of Eu^{3+} doped $YNbO_4$ powders by a flux method

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Yttrium niobate, $YNbO_4$, is a well-known host material for various color emitting phosphors. For instance, doping Bi and Eu enable to exhibit blue and red emissions, respectively.

The niobium ions are tetrahedrally coordinated by the oxygen ions, even though they are highly distorted. Niobates have two crystal structure: the high temperature T-phase corresponding to the scheelite structure ($I4_{1/a}$) and the low temperature monoclinically distorted M-phase (M-fergusonite, C_2). The transition temperature between these phases is around 900℃.

In this study, Eu^{3+} doped $YNbO_4$ phosphors were prepared by a solid-state reaction with a flux. The crystal structure and luminescent properties depended on firing conditions (temperature and time), doping concentrations, and a flux.

The intense PL (Photoluminescence) could be obtained at the firing conditions of 1300℃ for 12 hours and 7 wt% LiCl under N_2 atmosphere. It exhibited a strong red emission at 614 nm with 270 nm excitation.

Also, CL (Cathodoluminescence) spectra of $YNbO_4:Eu^{3+}$ showed a red emission at 614 nm. This indicated that $YNbO_4:Eu^{3+}$ phosphor can be applicable to various electronic displays.