



Tunable luminescence properties and energy transfer behaviour in Bismuth sensitized $\text{LaInO}_3:\text{Tb}^{3+}$ phosphors

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Abstract : A series of $\text{Bi}^{3+}:\text{Tb}^{3+}$ doped LaInO_3 phosphors were synthesized via Polyol method. The structure and luminescence properties were investigated. The optimum concentrations of Bi^{3+} and Tb^{3+} were 3mol% and 3mol%, respectively. Furthermore, $\text{LaInO}_3:3\text{Bi}^{3+}$ and $\text{LaInO}_3:3\text{at}\%\text{Tb}^{3+}$ phosphors emitted blue and green light and the emission color of $\text{LaInO}_3:\text{Bi}^{3+}$, Tb^{3+} could be tuned from blue to green through the energy transfer. This energy transfer from Bi^{3+} to Tb^{3+} was confirmed and investigated by photoluminescence spectrum and decay lifetime. With constantly increasing Tb^{3+} concentrations, the energy transfer efficiency from Bi^{3+} to Tb^{3+} in LaInO_3 host increased gradually and reached as high as 64%. The energy transfer mechanism ($\text{Bi}^{3+}-\text{Tb}^{3+}$) was proved to be dipole-dipole mechanism. Moreover, the phosphor of $\text{LaInO}_3:3\text{at}\%\text{Bi}^{3+}$, $3\text{at}\%\text{Tb}^{3+}$ could exhibit strong green emission with good CIE chromaticity coordinate. The results indicate that $\text{LaInO}_3:3\text{at}\%\text{Bi}^{3+}$, $3\text{at}\%\text{Tb}^{3+}$ is a potential green emitting phosphor for the application in LED and display field.

Keywords : Bi^{3+} Co-doping, $\text{LaInO}_3:\text{Tb}^{3+}$, Photoluminescence, Spectral overlap, Energy Transfer.

K.Ramachandra Rao *et al* /International Journal of ChemTech Research, 2017,10(13): 119-127.
