

Enhanced Photoluminescence Properties in Eu^{3+} Activated MgAl_2O_4 phosphors through Alkali ion co-doping

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Abstract—Lanthanide activated alkaline earth aluminate phosphors have potential applications in various optoelectronics devices such as Light emitting diodes (LED), Plasma panel display (PPD) and field emission displays (FED) etc. For practical applications these phosphor does not meet the required criteria as a highly efficient red luminescent materials. To improve the luminescence intensity of red component of phosphor, alkali metal ions such as Li^+ , Na^+ should be added in the host matrix. Herein we have prepared the $\text{Eu}^{3+}:\text{MgAl}_2\text{O}_4$ and alkali co doped $\text{Eu}^{3+}:\text{MgAl}_2\text{O}_4$ phosphor by sol-gel route. The enhanced photoluminescence properties have been studied for $\text{Eu}^{3+}:\text{MgAl}_2\text{O}_4$ and alkali co doped $\text{Eu}^{3+}:\text{MgAl}_2\text{O}_4$ samples through steady state and time decay analysis. The enhanced luminescence properties were also confirmed by improved colour co-ordinate as well as intense glow detected through naked eye. The obtained results clearly indicated that alkali co-doped Eu^{3+} activated MgAl_2O_4 phosphors might be used as LEDs, FEDs and PPDs applications.