

SPECTROSCOPY OF LUMINESCENT CRYSTALS CONTAINING RARE EARTH ELEMENTS

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We have studied the spectroscopy of luminescent crystals containing rare earth elements such as KEuGe_2O_6 ,^a $\text{Cs}_3\text{EuSi}_6\text{O}_{15}$,^b $\text{K}_4[(\text{UO}_2)\text{Eu}_2(\text{Ge}_2\text{O}_7)_2]$, and $\text{R}_2(\text{C}_8\text{H}_{10}\text{O}_4)_3$ (R= Y, Tb, or Eu). The emission and excitation spectra of these compounds were recorded at ambient temperature. These spectra are consistent with the structures which were determined by single crystal X-ray diffraction. Crystals containing hybrid luminescent centers were also synthesized and interesting energy transfer mechanisms were observed. For example, dramatic luminescence quenching was found in $\text{KEu}_x\text{Nd}_{1-x}\text{Ge}_2\text{O}_6$ ($x= 0.98, 0.96, 0.94,$ and 0.84) as well as in $\text{Cs}_3\text{Eu}_{0.98}\text{Nd}_{0.02}\text{Si}_6\text{O}_{15}$, while different compositions of $\text{Y}_x\text{Eu}_y\text{Tb}_{2-x-y}(\text{C}_8\text{H}_{10}\text{O}_4)_3$ exhibit different emission colors. Emission lifetimes were also measured for these compounds, and the results shed light on the energy transfer mechanisms. Detailed results of our research will be presented.

^aP.-L. Chen, P.-Y. Chiang, H.-C. Yeh, B.-C. Chang, and K.-H. Lii, *Dalton Trans.*, 1721 (2008).

^bM.-Y. Hung, Y.-H. Chen, B.-C. Chang, and K.-H. Lii, *Chem. Mater.* **17**, 5743 (2005).