

Photoionization of Eu^{2+} Ions in $\text{Sr}(\text{SCN})_2$

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The Eu^{2+} doped alkaline earth thiocyanides $\text{Sr}(\text{SCN})_2$ and $\text{Ba}(\text{SCN})_2$ have been investigated to study the influence of covalency on the $4f^65d^1 \rightarrow 4f^7$ emission [1]. These materials show a bright green luminescence at low temperatures, and in $\text{Sr}(\text{SCN})_2:\text{Eu}^{2+}$ a strong temperature quenching is observed. With the Stokes shift comparable to those of other compounds, the quenching in this system can be explained by thermal excitation from the $4f^65d^1$ state to the conduction band, and we estimate the energy difference between the $4f^65d^1$ level and the conduction band to be $1,100 \text{ cm}^{-1}$.

In order to confirm this assumption, we are performing photoionization studies to determine the ionization energy of Eu^{2+} in this host. The highly hygroscopic nature of $\text{Sr}(\text{SCN})_2:\text{Eu}^{2+}$ requires the crystals to be kept in sealed quartz vials, thus, standard photoconductivity measurements cannot be applied in this case. Instead, we are using a non-contact optical method based on thermoluminescence to study electron transfer processes [2].

[1] C. Wickleder; Z. Anorg. Allg. Chem. 627 (2001) 1693.

[2] J. Fleniken, J. Wang, J. Grimm, M.J. Weber, and U. Happek; J. Lumin. **94** (2001) 465.