Optical spectroscopy of six coordinated Eu\textsuperscript{2+} and Ce\textsuperscript{3+} in M\textsuperscript{2+}Al\textsubscript{2}B\textsubscript{2}O\textsubscript{7} (M\textsuperscript{2+}=Ca, Sr, Ba)

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Detailed analysis of the excitation and emission spectra of Eu\textsuperscript{2+} and Ce\textsuperscript{3+} in the compound M\textsuperscript{2+}Al\textsubscript{2}B\textsubscript{2}O\textsubscript{7} (M\textsuperscript{2+}=Ca, Sr, Ba) is reported. The M\textsuperscript{2+} ion is octahedrally coordinated in this structure. The crystal field splitting, Stokes shift and thermal quenching along with the Hyung-Rhys parameter and the phonon frequencies are reported for the first time for the Eu\textsuperscript{2+} ion in these compounds. The optical data is then compared to the structural aspects of the host lattice. The optical properties are also compared with those reported for the Eu\textsuperscript{2+} ion in Cs\textsubscript{2}M\textsuperscript{2+}P\textsubscript{2}O\textsubscript{7} [(M\textsuperscript{2+}=Ca, Sr, Ba)] structure [1]. We also discuss and compare the optical properties of Eu\textsuperscript{2+} and the Ce\textsuperscript{3+} ions in these materials.

Figure 1: The room temperature excitation and emission spectrum of Eu\textsuperscript{2+} doped BaAl\textsubscript{2}B\textsubscript{2}O\textsubscript{7}

References