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Fluorescence enhancement of Tb³⁺-doped CaAl-LDH by cytosine

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Abstract:

Tb³⁺-doped CaAl LDH with fluorescent property has been prepared in ethanol/water media. After it is exposed to 0.01, 0.05, 0.10, and 0.25 mol·L⁻¹ cytosine solution, respectively, the amount of the cytosine present in the Tb³⁺-doped CaAl-LDH/Cyt-n composites is separately about 0.01, 0.01, 0.03, and 0.05 mol per 1 mol Tb³⁺-doped CaAl-LDH by compositional analysis. XRD patterns reveal some reflections attributed to cytosine in some composites. IR spectra show that bands attributed to cytosine appear in some composites. Fluorescent spectra suggest that the intensity of the emission due to ⁵D₄—⁷F₅ transition of Tb³⁺ gradually increases with increasing amount of the cytosine present in the Tb³⁺-doped CaAl-LDH. The mechanism of fluorescence enhancement based on the intermolecular energy transfer from cytosine to Tb (III) has been proposed and discussed.

Graphical abstract

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