

Thermal quenching mechanisms of the Eu^{3+} luminescence in $\text{Ca}_9\text{Al}(\text{PO}_4)_7$ obtained by citric route.

Autorzy

Robert Pązik
Katarzyna Zawisza
Adam Watras
Kinga Maleszka-Bagińska
Philippe Boutinaud
Rachid Mahiou
Przemysław J. Dereń

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The citric route was employed for synthesis of the pure phase $\text{Ca}_9\text{Al}(\text{PO}_4)_7\text{:Eu}^{3+}$ (CAIP:Eu³⁺) powders as an attractive alternative to the solid state reaction (no need of multistep and long thermal treatment). Structural properties of the final product were studied by means of X-ray diffraction as well as Rietveld refinement was conducted in order to calculate the cell parameters. The thermal behavior of the emission was studied using excitation line well matched with the $^7\text{F}_0 \rightarrow ^5\text{D}_4$ absorption band covering broad range of temperature. Activation energy was estimated to be equal to $10,550 \text{ cm}^{-1}$. The thermal behavior of the Eu^{3+} luminescence in CAIP crystal lattice shown that the almost 80% of intensity is kept up to 430 K.

Słowa kluczowe

Inorganic compounds, optical materials, Chemical synthesis, luminescence

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