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SYNTHESIS AND OPTICAL PROPERTIES OF CR-SUBSTITUTED BETA-TRICALCIUM PHOSPAHTE

Jonas Stadulis¹, Sapargali Pazylbek¹, Arturas Katelnikovas¹, Aleksej Zarkov¹

¹Institute of Chemistry, Vilnius University, Naugarduko 24, LT-03225 Vilnius, Lithuania
jonas.stadulis@chgf.stud.vu.lt

Calcium phosphates (CPs) are the family of materials, widely used in different areas such as medicine and bone regeneration, catalysis, sensors, removal of heavy metals from water, as host matrices for the development of optical materials etc. One of the CPs most frequently used for the fabrication of bioceramics is beta-tricalcium phosphate (β -TCP, $\text{Ca}_3(\text{PO}_4)_2$); moreover, this host material can be used for the development of luminescent materials employing the substitution of Ca by other optically active ions. In the present work, Cr^{3+} -doped β -TCP powders with various Cr content were synthesized by wet precipitation method using $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$, $\text{Cr}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ and $(\text{NH}_4)_2\text{HPO}_4$ as starting materials. As prepared precipitates were filtered, washed with water and ethanol and dried in an oven at 50 °C overnight. For the synthesis of β -TCP dried precipitates were annealed at 1000 °C for 5 hours. Phase purity and crystal structure of synthesized samples were studied by X-ray diffraction (XRD), electron paramagnetic resonance (EPR) and infrared spectroscopy (FTIR). Chemical composition of the samples was determined by inductively coupled plasma optical emission spectrometry (ICP OES). Morphological features of synthesized powders were investigated by scanning electron microscopy (SEM). Optical properties were investigated by means of photoluminescence measurements. Excitation spectra, emission spectra and decay curves of the samples were studied. Temperature-dependent photoluminescence measurements were performed as well.

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