

# SYNTHESIS AND LUMINESCENT PROPERTIES OF EU-DOPED $\text{Ca}_2\text{PO}_4\text{Cl}$

Paulina Pažerauskaitė<sup>1</sup>, Artūras Katelnikovas<sup>1</sup>, Aleksej Žarkov<sup>1</sup>

<sup>1</sup>Institute of Chemistry, Vilnius University, Naugarduko 24, LT-03225 Vilnius, Lithuania  
[paulina.pazerauskaite@chgf.stud.vu.lt](mailto:paulina.pazerauskaite@chgf.stud.vu.lt)

Functional materials with adjustable luminescence have become a research hotspot for their broad application prospects. As one of the most common and highly efficient activators, an  $\text{Eu}^{2+}$  ion possesses broadband absorption in the UV to blue regions, as well as multicolor emission. Calcium phosphates are the family of materials, widely used in different areas including the development of optical materials. Calcium chlorapatite (ClAp,  $\text{Ca}_5(\text{PO}_4)_3\text{Cl}$ ) and goryainovite ( $\text{Ca}_2\text{PO}_4\text{Cl}$ ) are calcium halophosphate minerals occurring in nature. Synthetic ClAp found its practical application in purification of water and sediments from heavy metals, lanthanide-doped ClAp was investigated in terms of optical properties.  $\text{Ca}_2\text{PO}_4\text{Cl}$  is a less studied material, most of the papers being focused on the preparation and investigation of optical properties in lanthanide-doped  $\text{Ca}_2\text{PO}_4\text{Cl}$ . In the present work, Eu-doped  $\text{Ca}_2\text{PO}_4\text{Cl}$  powders with various Eu content were synthesized and comprehensively characterized. Phase purity and crystal structure of the synthesized samples were studied by X-ray diffraction (XRD) and infrared spectroscopy (FTIR). Morphological features of synthesized powders were investigated by scanning electron microscopy (SEM). Luminescent 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.

Acknowledgements. This project has received funding from the Research Council of Lithuania (LMTLT), agreement No S-MIP-23-85.

---