

# MOLTEN SALT SYNTHESIS AND INVESTIGATION OF RADIOCHROMIC BARIUM APATITE

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Recently, optical materials and their luminescent properties have become a highly relevant topic. There are inorganic materials that exhibit the radiochromic/photochromic effect — a reversible color change that occurs due to formation of defects in the materials crystal structure, leading to different absorption spectra. Due to the favorable crystalline structure for the photochromic effect, apatite-type compounds are the most dominant in scientific research. One of such promising compounds is barium chlorapatite ( $\text{Ba}_5(\text{PO}_4)_3\text{Cl}$ ), which undergoes a color change that persists for a certain period of time, when exposed to X-ray radiation. Such materials are promising for the development of information technologies, medicine, the military industry and everyday life.

This study focuses on the impact of synthesis conditions on the intensity of the radiochromic effect and the persistence of the altered color in  $\text{Ba}_5(\text{PO}_4)_3\text{Cl}$ . The first part of the research involves optimizing the synthesis conditions, taking into account the synthesis temperature. In the next research stage, color changes are monitored over time. Results show tendencies that there is a particular optimal temperature for the most intense color change as well as slow, gradual color fading as the time passes. The phase purity and crystal structure of the synthesis products were analyzed using powder X-ray diffraction (XRD) and Fourier-transform infrared spectroscopy (FTIR). Morphological properties were observed using a scanning electron microscope (SEM).