

UVC upconversion emission of $\text{Ca}_9\text{Y}_x\text{Lu}_{1-x}(\text{PO}_4)_7$ polycrystals doped with Pr^{3+} ions

K. Lemański^{1,#}, O. Bezkrovna^{1,2}, N. Rebrova¹, P. J. Dereń¹

¹ Institute of Low Temperature and Structure Research, Polish Academy of Sciences,
ul. Okólna 2, 50-422 Wrocław, Poland

² Institute for Single Crystals, NAS of Ukraine, Nauky Ave. 60, Kharkiv, 61001, Ukraine

In recent years, there has been growing interest in disinfection methods, especially those that effectively and naturally eliminate microorganisms that threaten humans. Using radiation within a specific UVC range is a good approach because it can eliminate bacteria and viruses from surfaces that people come into contact with. One idea for combating microorganisms in the human environment is the use of luminescent materials that would produce UVC radiation (range 100-280 nm) when excited by visible light, including sunlight, thus eliminating the need for specialized equipment in disinfection areas. Praseodymium is a rare earth element that, due to its electronic structure, is well suited for achieving upconversion from the UVC range when excited by visible light [1, 2]. In this work, we present the results of research on $\text{Ca}_9\text{Y}_x\text{Lu}_{1-x}(\text{PO}_4)_7$ polycrystals doped with Pr^{3+} ions. The absorption, excitation, luminescence, and emission decay profiles of praseodymium(III) ions were measured and discussed. The investigated compounds possess characteristics that confirm their potential in luminescent and disinfection applications.

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[1] K. Lemański, O. Bezkrovna, N. Rebrova, R. Lisiecki, P. Zdeb, P. J. Dereń (2024) *Molecules*, 29, 2084.

[2] N. Rebrova, K. Lemański, P. Zdeb, B. Macalik, O. Bezkrovnyi, P. J. Dereń (2024) *Inorg. Chem.*, 63, 3028-3036.

corresponding author: K.Lemanski@intibs.pl