Interconfigurational d-f luminescence of Ce^{3+} and Pr^{3+} in double phosphate hosts

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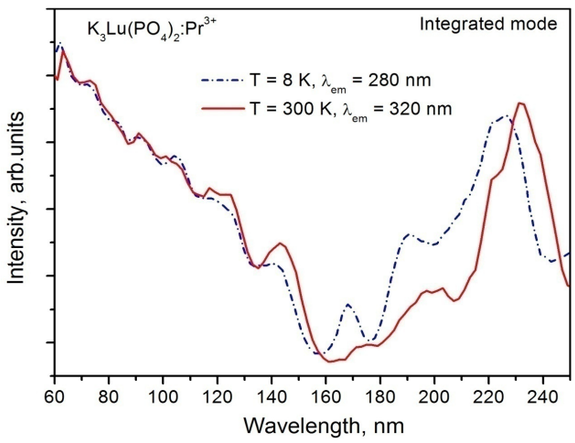
Luminescent inorganic materials doped with Ce^{3+} and Pr^{3+} are currently under very active investigation, as in many cases they show strong electric dipole allowed 5d-4f optical transitions located in the UV and visible regions. These bands find numerous applications in important technological fields, such as the development of scintillators, materials that convert ionizing radiation (X-rays and γ-rays) to UV and visible emission, and are useful in medicine and high energy physics.

The search for new materials showing efficient 5d-4f luminescence of Ce^{3+} and Pr^{3+} has led our research group to the synthesis of several double phosphates doped with these ion. In this contribution I will present recent results obtained during this search. The synthesis and the structural characterization of these materials will be described in detail. Luminescence spectra and decay curves measured upon VUV-UV and X-ray excitation will be presented and discussed, together with the prospective applications of these luminescent materials.



Excitation spectra in the VUV-UV region of $K_3Lu(PO_4)_2$ doped with 1 mol% of Pr^{3+} at 8 and 300 K. The band gap of the host is located around 150 nm.