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Fluorescence Intensity Ratio and lifetime thermometry of praseodymium phosphates for temperature sensing

S. Gharouel^{a,1}, L. Labrador-Páez^b, P. Haro-González^b, K. Horchani-Naifer^a,

M. Férid^a

^aLaboratoire de Physico-Chimie des Matériaux Minéraux et leurs Applications, Centre National des Recherches en Sciences des Matériaux, B.P.73 Soliman, 8027, Technopole Borj Cedria, Tunisia.

^bFluorescence Imaging Group, Departamento de Física de Materiales, Universidad Autónoma de Madrid, C/Francisco Tomás y Valiente 7, Madrid 28049, Spain

saidagharouel@gmail.com

Abstract

We report on the temperature sensing properties of varied praseodymium phosphate hosts $M^I(\text{Na,Li,K})\text{Pr}(\text{PO}_3)_4$ and $\text{PrP}_5\text{O}_{14}$. Details about fabrication, materials, and spectroscopic characterization are presented. The fluorescence properties of the praseodymium phosphates have been systematically investigated from room temperature to 363 K under selective laser excitation in the $^3\text{P}_0$ multiplet. The temperature sensing measurements were carried out by using fluorescence intensity ratio and fluorescence lifetime techniques. From this systematic

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