Iranian Journal of Physics Research, Vol. 21, No. 2, 2021
DOI: 10.47176/ijpr.21.2.39271

Synthesis of potassium chloride crystals doped with dysprosium and investigation of its thermoluminescence and photoluminescence properties

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(Received 15 October 2019 ; in final form 04 April 2021)

Abstract

In this study, the thermoluminescece (TL) behavior of potassium chloride dosimeter doped with dysprosium impurity (KCl:Dy) was studied. Evaluation of the morphology, shape and size of prepared crystal were done by X-ray diffraction (XRD) and scanning electron microscopy (SEM) analysis. Potassium chloride was prepared by co-precipitation with different percentages of dysprosium impurities and the best TL response was determined for gamma rays in 0.5 mol% of impurity. The optimum annealing regime was obtained at 700 ℃ for 30 minutes. Using a general order kinetic based on computer simulator, the glow curve and corresponding kinetics parameters were calculated. The TL glow curve of synthesized dosimeter shows two peaks at 393 and 415 K. Also, other dosimetric properties such as fading and TL dose response were studied

Keywords: thermoluminescence, KCl, co-precipitation, dysprosium, TLD

For full article, refer to the Persian section