Patent Search

Invention Title	A STRUCTURAL, OPTICAL, PHOTOLUMINESCENCE AND THERMOLUMINESCENCE EVALUATION METHOD FOR LITHIUM DOPED AND COPPER-LITHIUM CO-DOPED MG2B2O5 NANOPHOSPHORS FOR RADIATION DOSIMETRY
Publication Number	11/2024
Publication Date	15/03/2024
Publication Type	INA
Application Number	202211051623
Application Filing Date	09/09/2022
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	PHYSICS
Classification (IPC)	G01T0001110000, C09K0011640000, G01N0021640000, G01N0023207000, C09K0011770000

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Abstract:

The present invention describes a structural, optical, photoluminescence and thermoluminescence evaluation method on lithium doped and copper-lithium co-doped MG2B2O Nanophosphors. The doping of lithium ion (0.1% concentration) in host material Mg2B2O5 nanophosphors, along with that copper (0.1%)-lithium (0.1%) co doping as also introduced in order to study their effect in luminescence properties of Mg2B2O5 nanophosphors using combustion technique for synthesis of nanophosphors. The prepared samples were characterized using different techniques like x ray diffraction for structural/phase analysis, photoluminescence spectroscopy at excitation wavelength of 325 nm, diffuse reflectance spectroscopy for determination of band gap when doped with lithium and Cu-Li co-doped host material and thermoluminescence analysis for investigating defects present in the prepared samples.

Complete Specification

DESC:FIELD OF INVENTION:
This invention generally relates to the field of the doping of lithium ion in host material Mg2B2O5 nanophosphors, along with that copper, lithium co-doping, and more particularly relates to a structural, optical, photoluminescence and thermoluminescence evaluation method on lithium doped and copper-lithium co-doped MG2B2O5 Nanophosphors.
BACKGROUND OF THE INVENTION
The present invention pertains to various observations through the TL analysis of 2 KGy gamma irradiated Mg2B2O5 nanophosphors doped with Europium, copper, lithium and copper-lithium shows that, but not limited to:
1. Diffuse reflectance data shows that with Cu-Li(0.1)% co-doping band gap of material is found to be 5.08 eV, a minimum value. Whereas with Cu and Li doping even high concentration up to three times of initial doping was not enough to tune band gap to this value. So, with co-doping, tuning of band gap could be easily done with low concentration of dopants depending upon the application areas as shown in the figure 1 below.
2. Although maximum intensity is found for Cu(0.1)% doped Mg2B2O5 nanophosphors but after that Mg2B2O5 nanophosphors doped with Cu-Li (0.1)% is having highest intensity.
3. Along with high intensity TL response of that Mg2B2O5 nanophosphors doped with Cu-Li (0.1)% is found to be in low temperature region which suggests that this kind of material are quite useful and perfect for medical dosimetry as they have maxima towards low temperature region. Whereas with dopants this maximum is found to be towards high temperature region which has limitations in medical dosimetry applications as shown in the figure 2 below

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Page last updated on: 26/06/2019