

STRUCTURAL STUDIES ON MAGNESIUM CALCIUM TELLURITE DOPED WITH Eu^{2+} AND Dy^{3+}

Nur Shahira Alias, Rosli Hussin, Musdalilah Ahmad Salim, Siti Aisyah Ahmad Fuzi, Mutia Suhaibah Abdullah, Suhailah Abdullah and Mohd Nor Md Yusof.

Phosphor Research Group, Jabatan Fizik, Fakulti Sains, Universiti Teknologi Malaysia, 81310 Skudai, Johor.

ABSTRACT

The samples of phosphor material based on alkali earth tellurite, doped with rare earth have been prepared using solid state reaction method. The samples are with the composition in mol %: $x\text{MgO}-(30-x)\text{CaO}-70\text{TeO}_2$ with $0 \leq x \leq 30$ mol%, and have been doped with Eu_2O_3 (2mol%) and Dy_2O_3 (1mol%). The structure of the samples have been investigated by means of X-Ray Diffraction, Raman and Infrared spectroscopy. The xray diffraction results show that two phase are observed in the samples, which is MgTe_2O_5 and CaTe_2O_5 phase. Raman spectroscopy studies show that the vibrations of the samples are identical with the $\alpha\text{-TeO}_2$ vibrations, with a shift about 40-50 cm^{-1} . Strong bands are observed located at around 435, 616, 689, 785, and 807 cm^{-1} . As the concentration of the modifier, MgO and CaO increased, the coordination of TeO_4 are transform from the corner sharing, $\alpha\text{-TeO}_2$ structure to the edge sharing, $\beta\text{-TeO}_2$ structure. It is also indicated that the increasing of MgO contribute to the increasing of symmetry vibration of TeO_4 molecule, $\nu_s(\text{TeO}_4)$, while the addition of CaO increased the asymmetry vibration of TeO_4 molecule, $\nu_{as}(\text{TeO}_4)$. The comparison between Raman and IR spectra is also include to identify the mode vibration of the samples.

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REFERENCES

- [1]. Luo, X., W. Cao, and Z. Xiao. *Journal of Alloys and Compounds*, (2006). 416(1-2): p. 250-255.
- [2]. Kumar, K., S.B. Rai, and D.K. Rai. (2007). *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 66(4-5): p. 1052-1057.
- [3]. C. Duverger, M.B., S. Turrell. (1997). *Journal of Non-Crystalline Solids*, 220: p. 169-177.
- [4]. M.A.P Silva, et al.. (2001). *Journal of Physics and Chemistry of Solids*, 62: p. 1055-1060.
- [5]. Sang-Do Han, et al.. (2008). *Journal of Luminescence*, 128: p. 301-305.
- [6]. Noguera, O., et al.. (2003). *Journal of Non-Crystalline Solids*, 330(1-3): p. 50-60.
- [7]. Takao Sekiya, N.M., Atsushi Ohtsuka, Mamoru Tonokawa. (1992). *Journal of Non-Crystalline Solids*, 144: p. 128-144.
- [8]. El-Mallawany, R.A.H.. (2002), Menofia, Egypt: University of Menofia.

