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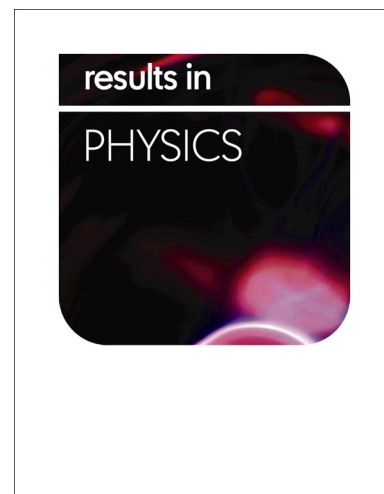
Role of Mn^{2+} ions on optical and luminescent properties of CaF_2 - Y_2O_3 - ZnO - B_2O_3 - SiO_2 glasses

G. Ravi Kumar, S. Uday Baskar, M.C. Rao

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Role of Mn²⁺ ions on optical and luminescent properties of**CaF₂-Y₂O₃-ZnO-B₂O₃-SiO₂ glasses**G. Ravi Kumar¹, S. Uday Baskar² and M.C. Rao^{3*}¹Department of Physics, Sreenidhi Institute of Science & Technology, JNTUH-501301, India²Department of Physics, G. Narayanamma Institute of Technology & Science,
JNTUH-500104, India³Department of Physics, Andhra Loyola College, Vijayawada- 520008, India**Abstract**

MnO doped CaF₂-Y₂O₃-ZnO-B₂O₃-SiO₂ glasses were synthesized. Different physical parameters of these glass materials such as density, molar volume, electronegativity, optical basicity and refractive index were calculated. The glass transition and glass crystallization temperatures of these glasses were measured by DTA analysis. The mechanical properties such as Young's modulus, Shear modulus, Bulk modulus, Poisson's ratio and microhardness of these materials were also calculated. Different characterization such as FT-IR, ESR, DC conductivity, optical absorption and photoluminescence were carried out on the prepared glass samples. ESR studies of these glass materials exhibited sextet at lower concentrations of MnO. The optical bandgap, Urbach energy, transition probability and emission cross section of these glass materials were calculated. Semiconducting nature of these glass materials was also observed due to the significant increase in BO₃ and MnO₆ units with increasing concentration of MnO. Optical absorption studies revealed that the increase in intensity of different octahedral peaks were due to the increase in concentration of MnO. Photoemission occurs around 545 to 567.3 nm suggested that the emission was red-shifted for higher MnO concentration and green-shifted for lower MnO concentration.

Keywords: CaF₂-Y₂O₃-ZnO-B₂O₃-SiO₂ glasses; DTA; ESR; Elastic properties; DC conductivity; Optical properties; Photoluminescence studies.

*Corresponding author email: raomc72@gmail.com, Ph. No. 0866- 2453485

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