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Anindya Sundar Das, Madhab Roy, Debasish Roy, Sanjib Bhattacharya, P.M.G. Nambissan

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Defects characterization and study of amorphous phase formation in $x\text{V}_2\text{O}_5-(1-x)\text{Nd}_2\text{O}_3$ binary glass nanocomposites using positron annihilation and correlated experimental techniques

Anindya Sundar Das^{a,b,c,*}, Madhab Roy^b, Debasish Roy^c, Sanjib Bhattacharya^d,
P.M.G. Nambissan^e

^a Department of Electronics and Communication Engineering, Swami Vivekananda Institute of Science & Technology, Dakshin Gobindapur, Kolkata 700145, India

^b Department of Electrical Engineering, Jadavpur University, Jadavpur, Kolkata 700032, India

^c Department of Mechanical Engineering, Jadavpur University, Jadavpur, Kolkata 700032, India

^d Department of Engineering Sciences and Humanities, Siliguri Institute of Technology, Darjeeling 734009, West Bengal, India

^e Applied Nuclear Physics Division, Saha Institute of Nuclear Physics, Kolkata 700064, India

ABSTRACT

A glass nanocomposite system with the combination of transition metal oxide and rare earth oxide of the general nomenclature $x\text{V}_2\text{O}_5-(1-x)\text{Nd}_2\text{O}_3$ for $x = 0, 0.2, 0.4, 0.6$ and 0.8 have been synthesized through the rapid quenching process and characterized by X-ray diffraction, transmission electron microscopy and UV-Vis absorption studies. Positron annihilation lifetime and coincidence Doppler broadening measurements are further employed to identify the vacancy or void-type defects existing in the composites of the different V_2O_5 concentrations (x). The X-ray diffraction patterns indicate distinct diffraction peaks with

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