Morphological and optical properties of thin film metal oxide based phosphate glasses for optoelectronic technology,

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Abstract:

Four glass samples P1-2xNa1-2xO3-4xPbx where (x = 0, 0.1, 0.15 and 0.2) have been synthesized by melt quenching mechanism. Using thermal evaporation technique, a thin film of each glass was prepared. Our results show that the morphology of these films was studied through Atomic Force Microscopy. The lead content increases the diameter of the circular agglomerated shapes, which increases the homogeneity of the sample surface. On the other hand, Raman spectra of these films indicate that, the characteristic peaks of phosphate glass are shifted broadened and their intensities decreased which indicated to the effect of the lead content. The optical band gaps, index of refractivity, dielectric constant and optical dielectric constant have been inspected from the UVVIS spectrum. Our conceptions elucidated that the transition form in these films is allowed in indirect way with 3.1 eV energy gap value which improved to 3.5 eV at x = 0.2. Moreover, the dispersal in the index of refractivity was calculated according to the oscillator pattern.

Keywords:

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