

Influence of PbO molar fraction and Se doping on borate glasses

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Glasses of $x\text{PbO}(100-x)\text{B}_2\text{O}_3$ composition, with $x = 20, 40, 50$ and 60 , and doped with Se (0.01, 0.02, and 0.03 mol) were synthesized from H_3BO_3 , PbO , Pb_3O_4 and Se powders, homogenized and then fused at about $700 - 800^\circ\text{C}$. The fused mixing was annealed at temperatures lower than the glass transition one, about 400°C and during 3 hours. Samples were then slowly cooled down to room temperature. PbO concentration correlates with an increase on the color intensity of the samples. Final glasses were cut, mechanical etched and then characterized by spectrometry in the $400 - 830\text{ nm}$ range and by differential scanning calorimetry (DSC) and thermal gravimetry (TG). The influence of PbO and Se concentrations on the spectra was confirmed studying the correlation between molar fraction and intensity of 435 nm and 610 nm peaks. TG results indicate that, when heated up to 800°C , samples with Se decompose. However, sample color as far as an increase on the 435 nm absorption peak indicate the possible incorporation of Se to the glass structure. DSC diagrams show a glass transition temperature of about 460°C . DSC also indicate the glasses have up to three crystalline phases. Future work will confirm these phases and Se incorporation by X-ray diffraction.