Abstract :

Aluminosilicate glasses doped with iron of the valence state III have satisfactory properties, and may be suitable as nuclear glasses, dedicated for storage of radioactive waste solutions, cause of the good reception capacities of actinides and / or lanthanides, and excellent long-term performance properties. In this work, a simplified aluminosilicate glass composition: SiO_2-Al_2O_3- Fe_2O_3-MgO-Li_2O-Na_2O-K_2O-Y_2O_3-ZrO_2-La_2O_3- MoO_3 is synthesized by a batch method of double melting of oxides at 1,450 ° C during 1h30min. The influence of the content of Fe_2O_3 in the glass in the interval: 0.50 to 7.00% was studied. Most of the basic properties increase with the glass Fe_2O_3 content. The Archimedes density of the materials is in the range 2.55-2.63 g / cm_3, the molar volume in the range 22.92 to 23.20 cm_3/mol, Both X-ray diffraction and scanning electron microscopy analyses reveal a pure amorphous structure. Infrared Spectroscopy Fourier Transform gave spectra representative of the chemical composition of the glasses studied. The values of Vickers indentations are from 516 to 724 HV and Young modulus around 0.330-1.840 GPa. The electrical resistivity show a spring in the concentration of 3.0% Fe_2O_3, display both the combined effect of Fe valence change and the mixed alkali effect (MAE) in the glass.