VitroGeoWaste III

Sintering of glass as solution for reduction mine wastes from the Pyrenees

Oral presentation □ / Poster presentation ☑

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Abstract: In the Pyrenees there are abundant abandoned mines, which leave residues that produce a high environmental pollution, with the emission of potentially toxic elements such as As and Pb. In the present study a treatment for the elimination of these wastes by vitrification was evaluated. For the present study dumps from the Teodora antimony mine were used. The chemical composition of dumps contains SiO2 57.61%, Al_2O_3 16.93% and $Fe_2O_3$8.89%. CaO content is 0.39 wt%, Na_2O is 1.31 wt% and K_2O is 5.29 wt%. To manufacture the glass, addition of calcium and sodium was necessary. Therefore, the glass was obtained by mixing 50 wt% of mine waste, 40 wt% of waste from cutting a calcarenite-type ornamental rock and 10 % of Na_2CO_3. To produce the glass, the mixture was heated to 1450 °C. The rheological properties of the glass have been determined using DTA-TG, dilatometry and HSM. The glass transition temperature is 630 °C, the dilatometric softening point is 720 °C and the expansion coefficient in the range 25-450 °C is 12•10-6 °C-1. An exothermic peak, at 903 °C, corresponding to the crystallization temperature, is observed in the ATD. The endothermic peaks ranging from 1108 °C to 1306 °C are the result of the melting of the neoformed minerals. The resulting glass has a workability zone between 1190 °C and 1522 °C. The obtained glass is dark, between yellow and green and relatively dense, 2.67 g/cm3. The tests carried out show that a commercial glass with good workability conditions can be obtained.