

# VitroGeoWaste III

**Foam glasses made from waste flat glasses and sugar beet factory lime with the addition of borax and water glass**

Oral presentation  / Poster presentation

**Veljko Savić**

*Institute for Technology of Nuclear and Other Mineral Raw Materials, Bulevar Franšd'Eperea 86, 11000, Belgrade, Serbia*

*v.savic@itnms.ac.rs*

**Snežana Grujić**

*University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11000, Belgrade, Serbia*

**Abstract:** Foam glass is a lightweight and high-strength material that can be used for thermal and acoustic insulation. Foam glass with suitable properties for use as an insulating material was prepared using waste flat glass, a glass waste not normally used for the production of glass foam, and sugar beet factory lime (S), a CaCO<sub>3</sub>-rich waste, as a novel foaming agent. Three mixtures were prepared: Glass powder mixed with S (FG-S), glass powder mixed with S and borax (FG-S-B), and glass powder mixed with S and water glass (FG-S-WG). The mixtures were homogenized, pressed into pellets in a hydraulic press, and foamed at 800 °C for 30 min. The prepared samples were characterized mechanically, thermally, and microstructurally. All samples exhibit very low crystallinity. FG-B has the lowest total porosity but much higher compressive strength than FG-S and FG-S-WG. In addition to the total porosity, the pore size distribution of the samples also has a strong influence on the compressive strength. FG-S-B has smaller pores compared to FG-S and FG-S-WG, where the intense foaming of S and water glass leads to the rupture of the pore walls and their coalescence. The thermal conductivity follows the same trends as the total porosity. FG-S and FG-S-WG have a thermal conductivity of 0.044 W/m.K and FG-B has 0.059 W/m.K. All samples have good thermal properties as insulators, but FG-S-WG has poor mechanical properties.

#### Acknowledgments

This work was supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (Contract No. 451-03-47/2023-01/200023 and 451-03-47/2023-01/200135).