

Utilization of Different Waste Glasses to Fabricate Foamed Glasses

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Abstract

Waste management strategies have an essential role for more sustainable environment as well as for circular economy model. With this motivation, foamed glasses are one of the key candidate for achieving waste utilization purposes. The present paper is aimed at valorisation of different waste materials including flint container, green container, sodium-lamp, amber pharma and screen cover glasses by adding marble tailings (as a source of CaCO_3) as foaming agent to fabricate foamed glass product. Each waste glasses obtained from municipal waste storage area was washed, crushed, milled and screened so as to prepare the batches composed of 97 % waste glasses and the remaining as marble tailings. The cylindrical samples with 26-mm \varnothing were obtained by applying uniaxial hydrolic pressing at 0.7 MPa and heating step was carried out at 900 °C by adjusting 10 °C/min heating rate, then followed by keeping at the peak temperature for 30 min. The fabrication of foamed glasses based on different glass wastes and marble tailings were successfully achieved, and the properties of bulk density, porosity, water absorption and compressive strength were measured. It was observed that waste glasses with marble tailings can be integrated to form a lightweight foamed glass with good mechanical properties.

Keywords: Container glass; Foamed glass; Pharma glass; Screen cover glass; Sodium-lamp glass; Waste utilization.

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