

Abstract

The aim of this work is to reuse the mineral wastes (glass, brick, and clay) to produce granulated foam glass at different characteristics. For this, three types of granulated foam glass were manufactured at a temperature 850°C from glass wastes (cullet), brick wastes, clay, and limestone as a foaming agent. First, granulated foam glass obtained were used by substitution of fine aggregates in mortar. Physical (flow, density, and porosity), and mechanical tests (compressive strength) were carried on granulated foam glass-based mortars. Second, granulated foam glasses based on brick waste were also used as coarse aggregates to manufacture insulating materials. The latter are composite materials elaborated with three types of binder (cement, plaster, and resin). The lightness, phonic insulation, and thermal insulation were determined by measuring the apparent density, the wave velocity, and the thermal conductivity coefficient of the materials produced. The obtained results show that presence of crystalline phase in granulated foam glass coming from the brick wastes has a beneficial effect on both the structure and characteristics of granulated foam glass. Indeed, it has significantly improved the adhesion of granulated foam glass aggregates which has favored distribution of grains in the matrix (improvement of lightness, phonic insulation, and thermal insulation).