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Integrated utilization of high alumina fly ash for synthesis of foam glass ceramic

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Abstract

Due to the numerous increase of the building energy consumption and huge volume of industrial wastes produced in China, the development of thermal insulation materials is quite needed. Herein, foam glass ceramic, a kind of thermal insulation materials, was fabricated by using solid wastes high alumina fly ash and waste glass as the main raw materials. First, in this study the proportion scheme of this research was designed by using Factsage 7.1 and the foaming agent was CaSO₄. Secondly, the decomposition of calcium sulfate and the influence of process parameters, namely the sintering temperature and the foaming agent additive amount, on the microstructure and mechanical properties of foam glass ceramic were investigated. The experimental results showed that when the proposed foam glass ceramic was sintered at between 1180 and 1220 °C, it exerted excellent macro and micro properties. The optimum parameters were 2% CaSO₄ addition and sintering temperature of 1200 °C, and the corresponding bulk density and compress strength values were 0.98 g/cm³ and 9.84

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