

Synthesis and characterization of wollastonite glass-ceramics from eggshell and waste glass

ABSTRACT

Abundance of waste products disposed by communities has huge environmental impacts which lead to serious problems. Some waste products such as eggshells (ES) and soda lime silica (SLS) glass waste can be used as CaO and SiO₂ resources to bring on new potentially CaSiO₃, wollastonite glass ceramics (WGC) materials. Three samples labelled as S1, S2 and S3 with different compositions, each with of ES (15, 20, 25 weight%) and SLS glass (85, 80, 75 weight%) respectively, were prepared via solid state reaction method. All the samples were sintered at 800°C, 900°C and 1000°C. The elemental analysis of the raw materials and the WGC samples has been determined using the X-Ray Fluorescence (XRF) system where the experimental results show that the samples were mainly contained of CaO and SiO₂. The density of the WGC samples increase linearly with the sintering temperatures. The XRD results reveal that the optimum crystalline phase of the WGC samples was at around 900°C.

Keyword: Eggshells (ES); Glass waste; Wollastonite glass ceramics (WGC)