

**Effect of sintering temperature on physical and structural properties of
Alumino-Silicate-Fluoride glass ceramics fabricated from clam shell and soda
lime silicate glass**

ABSTRACT

A study on the effect of sintering temperature to the physical and structural of Alumino-Silicate-Fluoride (ASF) glass ceramics fabricated from clam shell (CS) and soda lime silicate (SLS) glass is conducted through conventional melt-quench technique. ASF glass ceramics composition with 25SLS-20CS-20P₂O₅-20Al₂O₃-15CaF₂ by weight percentage is analysed by using Energy X-ray (EDX), density (ρ), linear shrinkage, X-ray Diffraction (XRD), Fourier Transforms Infrared (FTIR) and Field Emission Scanning Electron Microscopy (FESEM). High content of Ca and Si in CS and SLS glass respectively promote the use of waste materials in production of ASF composition. The density and linear shrinkage of the samples varies with sintering temperature. Besides, XRD results showed that fluorapatite (Ca₅(PO₄)₃F) is a main phase existed in all samples meanwhile FTIR confirmed the presence of silica and also the formation of Casingle bondP phase in the composition. FESEM analysis showed the increasing of grain size and formation of needle-like microstructure known as fluorapatite when sintering temperature increase. Overall results promoted the ASF glass ceramics samples produced from waste materials as a high potential candidate for dental application.

Keyword: Alumino-Silicate-Fluoride composition; Clam shell; Soda lime silicate glass; Sintering; Fluorapatite