

# **Effect of impurities content from minerals on phase transformation, densification and crystallization of $\alpha$ -cordierite glass-ceramic**

## **Abstract**

$\alpha$ -Cordierite glass-ceramic was produced through crystallization of glass compacts made of milled glass frits. A comparative investigation between two different initial raw materials to synthesize  $\alpha$ -cordierite glass-ceramic using the same non-stoichiometric cordierite composition fabrication process was conducted. The existence of impurities in minerals significantly affected phase transformation, densification and crystallization behavior of  $\alpha$ -cordierite phase. Sintering and crystallization behavior was observed by dilatometry test, non-isothermal DTA, and XRD, respectively. The existence of  $\text{Fe}_2\text{O}_3$  in the minerals has resulted in greenish glass frits, while  $\text{CaO}$ ,  $\text{K}$  and other impurities act as modifying oxide in glass compositions, reducing the viscosity of the glass, and thus affect phase transformation of glass. Although the dielectric loss of the sample from mineral precursors was slightly higher than the sample from reagent grade oxides, other properties gained were comparable and not varies too much.