

## **Alteration in the microstructure of fly ash geopolymer upon exposure to elevated temperatures**

### **Abstract**

This paper represents the mechanical and microstructure changes in geopolymeric material synthesized by the alkali activation of locally source fly ash at high temperatures of 400, 600 and 800 °C. The high compressive strength of geopolymer cured at 70 °C underwent thermal shrinkage and substantial strength losing at temperatures of 400, 600 °C caused by the high dehydration of the structural water. Exposure to temperature of 800 °C, the geopolymer lost its strength due to extremely densification and expansion processes of the high unreacted silicate phase in the structure. The SEM results showed that the high activator content generated large quantities of unreacted silicate crystals at high temperatures which sintered at range of temperatures of 700-800 °C causing system failure.

### **Keywords**

Elevated temperatures; Geopolymer; SEM; Strength loss; Thermal shrinkage