

INVESTIGATION ON MICROSTRUCTURE AND MECHANICAL PROPERTIES OF FA/GGBS -BASED GEOPOLYMER AFTER EXPOSURE AT ELEVATED TEMPERATURE

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Fly ash (FA) and ground granulated blast -furnace slag (GGBS) are industrial wastes and have been widely utilized as construction material due to the environmental impacts. The use of these by-products is not only for the sustainable construction but also for reducing the emission of CO₂ due to the use of Portland cement. This study presents the microstructure and mechanical properties of geopolymer paste made from different ratios of low -calcium FA and GGBS after exposure at elevated temperature (500- 950°C). Compressive strength tests for both heated and unheated cylindrical specimens (using 50 mm x 100 mm mold) after the age of 28 days have been carried out. The results showed that the compressive strength of unheated specimens is increasing with increasing amount of GGBS in the mixes (up to 84 MPa). However, exposure at high temperature caused dehydration of water inside the specimen, resulting in strength loss. It was also found that exposure at 500°C caused a shrinkage, while a thermal expansion event was observed to occur at approximately 750°C. Moreover, scanning electron microscopy (SEM), X-ray diffraction (XRD), and mercury intrusion porosimetry (MIP) methods have been used to investigate the microstructure, phase composition, and pore distribution, respectively.