Thermal effect on flexural strength of geopolymer matrix composite with alumina and wollastonite as fillers

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Abstrak

The addition of alumina and wollastonite in geopolymer resin is expected to increase the thermal behavior of the geopolymer matrix composite. In this work, fine granules of solid alumina and acicular wollastonite used as filler were mixed with a fly ash-based geopolymer resin paste to form a composite matrix. The filler additions were 2.5% to 10.0% of the total weight with sodium silicates and sodium hydroxide used as activators. The results showed that the addition of alumina and wollastonite as filler did not have much effect on the flexural and compressive strength of the geopolymer matrix composite at room temperature. Wollastonite fiber, which was added in the form of a short-sized fiber, only produced a very small bridging effect. Nevertheless, alumina filler composite showed a good result after being exposed to a temperature at 200°C, although the strength was reduced as the temperature increased. Moreover, wollastonite fibers only managed to maintain 50% of their flexural strength after 2 hours exposure at a temperature of 200°C due to the damage of the wollastonite fiber.