

Effects of modulus of sodium silicate solution on mechanical properties and microstructure of geopolymer

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Four sodium silicate solutions of modulus $m=1.0, 1.2, 1.4$ and 1.6 were prepared as activators used in metakaolin-based geopolymer synthesis. The effects of modulus of activator on the mechanical properties and microstructure of the geopolymers were studied by strength test, infrared analysis(IR), X-ray diffraction(XRD), and scanning electron microscopy(SEM). Results showed that the most SiO_4 tetrahedrals were in low poly-degree status when the modulus varied from 1.0 to 1.6 . Compressive strength and flexural strength increased with the curing time. The geopolymer of $m=1.2$ achieved the highest compressive strength at 28 d (74.6 MPa) and its flexural strength was 11.2 MPa. The mineral composition of 4 geopolymers was similarly amorphous, and composed of geopolymeric gels and residual raw particles, while the microstructure of the geopolymer of $m=1.2$ was the smoothest one.

【Key Words】 : **geopolymer sodium silicate modulus mechanical properties microstructure**

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