

Effect of iron oxide on the thermophysical property of coal bottom ash-based geopolymer paste

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Ordinary Portland cement(OPC) has been widely used as a most popular construction material because of its many advantages like high compressive strength, high durability and usability. However, OPC manufacturing is one of the most energy-intensive and greenhouse gas emitting process. Thus, geopolymer was suggested and now recognized as a substitute for OPC in environmental aspect. Geopolymerization involves a chemical reaction under alkaline condition on Si-Al minerals and results in Si-O-Al-O structures. As a source material, coal combustion products(CCPs) can be used because CCPs are mainly consisting of silica, alumina and iron oxide. Among the CCPs, the bottom ash has been mainly disposed in landfill and caused additional environmental problems. Therefore, we utilized the bottom ash after crushing to improve its reactivity. In contrast to the silica and alumina, the iron oxide is reported to act as an inhibitor to geopolymerization. Hence, here we have investigated the effects of iron oxide content on some properties of geopolymer cured at 75°C for 24 hours with various concentrations of NaOH solution from 6M to 12M pre-mixed with waterglass.