

The intumescent behavior of coal bottom ash-based geopolymer by microwave energy

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This research is aimed to investigate the intumescent behavior of microwave curing coal bottom ash-based geopolymer. Microwave irradiation increases the temperature of geopolymer paste in a short time, resulting in the pore through the evaporation of water. We synthesized the geopolymer using a household microwave oven after casting a mixture of CBA and alkali activator in a Teflon mold. The geopolymer pastes were cured for various microwave irradiation times at different outputs from 200 W to 1000 W. The mass ratio of the CBA/alkali activator was fixed at 1, and the mass ratios of sodium silicate solution verse 14 M NaOH used as an alkali activator were set from 10:0 to 6:4. The results showed the bulk density and thermal conductivity of the geopolymer decreased with higher microwave power as well as longer irradiation time. The compressive strength increased to a certain level with increasing microwave irradiation time, but it showed a sharp drop at microwave irradiation time above the critical time. As the ratio of 14 M NaOH increased in the alkali activator the porosity decreased, but the porosity increased in a specific ratio above that.