

Effects of Different Calcination Temperature on the Geopolymerization of Fly Ash

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Abstract : Geopolymers are aluminosilicate-containing materials. The raw materials of the geopolymerization can be natural material such as kaolinite, metakaolin (calcined kaolinite), clay, diatomite, rock powder or can also be industrial by-products such as fly ash, silica fume, blast furnace slag, rice-husk ash, mine tailing, red mud, waste slag, etc. Reactivity of raw materials in geopolymer production is very important for achieving high reaction grade. Fly ash used in geopolymer production has been calcined to obtain tetrahedral SiO₂ and Al₂O₃ structures. In this study, fly ash calcined at different temperatures (700, 800 and 900 °C), and Al₂O₃ addition (Al₂O₃ at min (0%) and max (100%)) were used to produce geopolymers. HCl dissolution method was applied to determine the geopolymerization percentage of samples and Fourier Transform Infrared (FTIR) Spectroscopy was used to find out the optimum calcination temperature for geopolymerization. According to obtained results, the highest geopolymerization percentage (0% alumina added geopolymer equal to 35.789%; 100% alumina added geopolymer equal to 40.546%) was obtained in samples using fly ash calcined at 800 °C.

Keywords : geopolymer, fly ash, Al₂O₃ addition, calcination

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