

Compressive strength performance of coal bottom ash-based geopolymer depending on particle sizes

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Recently, due to the carbon footprint of Ordinary Portland cement(OPC) which is reported to produce more than 1.5 billion tons of CO<sub>2</sub> into the atmosphere annually, geopolymer binders have been suggested to substitute the OPC by using amorphous alumino-silicate materials activated with alkali solutions. In Korea, several million tons of fly ash and bottom ash are generated each year from coal fired thermal plants. Much of fly ash utilizing methods have been proposed while the bottom ashes are mostly landfilling. To make an environmental friendly product by using bottom ash as a source of raw material rich in silica and alumina, we have proposed the geopolymerization with the bottom ashes produced from Yeongheung coal fired power plant, Incheon, Korea. There are many parameters affecting compressive strength of geopolymer. In this research we have made a geopolymer binder with Na<sub>2</sub>SiO<sub>3</sub> and NaOH solutions and focused on the compressive strength depending on the particle sizes by varying the concentration of alkaline solution, curing period and temperature because the size of bottom ash is irregular when it is collected at the bottom of combustion chamber and thus has to be ground and sieved.