

## Current Research on Geopolymer Technology

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Geopolymer is an inorganic material with ceramic-like properties involved the chemical reaction of aluminosilicate oxides with alkali silicate solution yielding the amorphous to semi-crystalline 3-D polymeric structure at ambient temperature or slightly above. Geopolymers can be prepared from aluminosilicate materials, therefore any materials composed of silica ( $\text{SiO}_2$ ) and alumina ( $\text{Al}_2\text{O}_3$ ) can be used as starting materials for geopolymerization process; for example fly ash, metakaolin, bottom ash, slag, rice husk ash and other industrial wastes. Geopolymer can be synthesized as bulk and porous forms depends on their specified applications. In this sense, geopolymer is one of the optional materials in the future. It reduces the environmental degradation of global warming problems. The use of waste in geopolymer processing is also fits into sustainable economical domain. The main composition is silica and alumina which were decomposed by alkaline solution. Once the alumino-silicate powder is mixed with alkali solution a paste forms and quickly transforms into a hard geopolymer and gained strength. Fly ash based and metakaolin based geopolymer together with various kinds of industrial wastes were synthesized and the synthesis parameters of geopolymerization process were studied. The relation of the amount of alkali solution and ratios of materials used, curing time, curing temperature, and properties of geopolymer was investigated. Properties of geopolymer have been compared to other materials. Possible applications of geopolymer have been proposed.