

Synthesis and Characterization of Iron Modified Geopolymer and Its Resistance against Chloride and Sulphate

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Abstract : Geopolymer with different silica to alumina ratio with iron have been synthesized using sodium silicate, aluminum, and iron salts as a source of silica, alumina and iron source, and sodium/potassium hydroxide as an alkaline medium. The iron source will be taken from iron (III) salts and laterite clay samples. Laterite has been used as a natural source of iron in modified geopolymer. The synthesized iron modified geopolymer was submitted to the different aggressive environment, including chloride and sulphate solutions in different concentration. Different experimental techniques, including XRF, XRD, and FTIR, were used to study the bonding nature and effect of aggressive environment on geopolymer. The major phases formed during geopolymerization are sodalite ($\text{Na}_4\text{Al}_3\text{Si}_3\text{O}_{12}\text{Cl}$), albite ($\text{NaAlSi}_3\text{O}_8$), hematite (Fe_2O_3), and chabazite as confirmed from the XRD results. The resulting geopolymer showed greater resistance to sulphate and chloride as compared to the normal geopolymer.

Keywords : modified geopolymer, laterite, chloride, sulphate

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