

NEW INSIGHTS INTO THE ROLE OF HYDROXIDE IONS AND SILICATE SPECIES DURING GEOPOLYMERIZATION

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The specific role of hydroxide ions in highly alkaline silicate solutions has been hardly investigated due to the difficulty to quantify them. In this study, Hammet acidity functions of sodium silicate solutions have been assessed for the first time. The low acidity function values found in these solutions, when compared to pure sodium hydroxide solutions, has been explained by the buffering effect of silicate species using liquid state ^{29}Si NMR. Such a parameter has then been used to quantify the hydroxide ions ability to react during mixing alkali silicate solutions with metakaolin. Despite lower initial acidity function values for equivalent sodium hydroxide additions when compared to silicate-free solutions, it has been demonstrated that dissolution of the studied metakaolin is much more efficient in presence of silicate species. Such a phenomenon has been attributed to the gradual release of hydroxide ions resulting from silicate species condensation during the metakaolin dissolution.