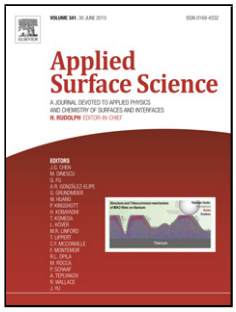
Accepted Manuscript



Title: Study on the role of n-SiO_2 incorporation in thermo-mechanical and microstructural properties of ambient cured FA-GGBS geopolymer matrix.

Authors: T. Revathi, R. Jeyalakshmi, N.P. Rajamane

PII: S0169-4332(18)30297-6
DOI: https://doi.org/10.1016/j.apsusc.2018.01.281
Reference: APSUSC 38420

To appear in: *APSUSC*

Received date: 30-10-2017
Revised date: 13-1-2018
Accepted date: 29-1-2018

Please cite this article as: Revathi T., Jeyalakshmi R., Rajamane N.P., Study on the role of n-SiO2 incorporation in thermo-mechanical and microstructural properties of ambient cured FA-GGBS geopolymer matrix., Applied Surface Science https://doi.org/10.1016/j.apsusc.2018.01.281

Study on the role of n-SiO_2 incorporation in thermo-mechanical and microstructural properties of ambient cured FA-GGBS geopolymer matrix.

T. Revathi [ab], R. Jeyalakshmi [b*], N. P Rajamane [a]

[a] *Centre for Concrete Research, SRM University, Kattankulathur, 603203, Chennai*

[b]*Department of chemistry, SRM University, Kattankulathur, 603203, Chennai*

*Corresponding author: rajyashree64@gmail.com

Tel: +91-44-27411454

Research Highlights

Oct 30, 2017

- Nano Silica replacement at 2.5% increases the early and final compressive strength in ambient curing condition and the same trend was also observed after exposure to temperature from 200-800^{0}C.
- Dissolution of siliceous layer of the fly ash aided by Nano particle seeds forming high silica gel region.
- Insitu ATR-FTIR spectroscopic results revealed the nucleation site at the surface of the fly ash and GGBS which leads to the formation of the gel as early stage of 24 hours period.

Abstract

The effect of Nano silica (seed) addition on the early period of geopolymer formation in the alkali mediated FA+GGBS reaction, was analyzed by Attenuated total reflectance Fourier transform infrared spectroscopy (ATR-FTIR). Experimentation on different dosages of NS (0 to 3%), in the 80% FA and 20% GGBS (precursor material) activated through NaOH and Na_2SiO_3 (MR:1.1). The seed (NS) added in the system triggering the nucleation that reduce the induction period by formation of more geo polymeric gel in the early period of 12-72 h that was evident from ATR-FTIR results and it was pronounced at the NS dose of 2.5% that yield rapid increase