

Characterization of Coal Fly Ash with Potential Use in the Manufacture Geopolymers to Solidify/Stabilize Heavy Metal Ions

Authors : P. M. Fonseca Alfonso, E. A. Murillo Ruiz, M. Diaz Lagos

Abstract : Understanding the physicochemical properties and mineralogy of fly ash from a particular source is essential for to protect the environment and considering its possible applications, specifically, in the production of geopolymeric materials that solidify/stabilize heavy metals ions. The results of the characterization of three fly ash samples are shown in this paper. The samples were produced in the TERMOPAIPA IV thermal power plant in the State of Boyaca, Colombia. The particle size distribution, chemical composition, mineralogy, and molecular structure of three samples were analyzed using laser diffraction, X-ray fluorescence, inductively coupled plasma mass spectrometry, X-ray diffraction, and infrared spectroscopy respectively. The particle size distribution of the three samples probably ranges from 0.128 to 211 μm . Approximately 59 elements have been identified in the three samples. It is noticeable that the ashes are made up of aluminum and silicon compounds. Besides, the iron phase in low content was also found. According to the results found in this study, the fly ash samples type F has a great potential to be used as raw material for the manufacture of geopolymers with potential use in the stabilization/solidification of heavy metals; mainly due to the presence of amorphous aluminosilicates typical of this type of ash, which react effectively with alkali-activator.

Keywords : fly ash, geopolymers, molecular structure, physicochemical properties.

Conference Title : ICGCGC 2019 : International Conference on Geopolymer Cement and Geopolymer Concrete

Conference Location : Tokyo, Japan

Conference Dates : September 09-10, 2019