

## ABSTRACT

Burning of coal in thermal power stations emits flyash (FA) particles in the effluent gas. Low calcium flyash (class F) rich in silica and alumina, is used in geopolymer synthesis and it is a subject of extensive research at present. Quality of flyash cannot be controlled and it may contain particles of varied size and also unburnt coal particles. Water absorption and its durability in adverse condition are affected by the above factors.

Metakaolin (MK) is an alumino siliceous material produced by calcining Kaolin mineral in 500 °C – 600 °C for 4 hours. Calcination removes the water present in the mineral and is subsequently ground to desired fineness. MK is suitable for geopolymer synthesis and MK based GP is equally strong and even more durable than FA based GP owing to the dehydroxylation, particle size, particle morphology and the specific surface area.

The objective of this research is to synthesise MK based GP concrete, by replacing FA in GP by MK in 25, 50, 75% and test for strength and durability. Three MK samples with Si/Al mass ratio of 0.87(M1), 1.11(M2), 1.21(M3) have been used in this research. Study of Micro structural property of MK based GP using Fourier Transform Infra-Red Spectroscopy (FTIR), Electron Dispersive Spectroscopy (EDS) and Scanning Electron Microscopy (SEM) techniques has been carried out. Evaluation of axial compressive strength of MK geopolymer brick masonry (MKBP) with aspect ratio between 2 and 5 has been done and compared with the compressive strength and Elastic modulus of Clay Brick Prism (CBP).