

Morphology of lightweight metakaolin-based geopolymer polystyrene composite paste at early ages

ABSTRACT

The integration of polystyrene foams as the lightweight agent in geopolymer is an alternative to produce a lightweight metakaolin-based geopolymer. Meanwhile, the microstructure studies assist to provide better understanding towards the formation of lightweight geopolymer. Hence, the present study examined the morphological characteristics of lightweight metakaolin-based geopolymer polystyrene composite at an early age. The lightweight metakaolin-based geopolymer paste is prepared at ratio 0.7 by using sodium hydroxide as an alkaline activator and the addition of polystyrene foams at ratio of 0.3. The morphology of the lightweight metakaolin-based geopolymer polystyrene paste was analyzed through SEM analysis at 14 days curing ages. The lightweight geopolymer at early ages consisted of the unresponsive metakaolin and porous gel as it gave less dense and compact microstructure. Meanwhile, the analysis showed that the polystyrene foams blended-well in the geopolymer matrix. However, the high temperature during the curing process damages the texture of some of the polystyrene foams. Yet, the utilization of the polystyrene foams as lightweight agents is believed to produce a lightweight metakaolin-based geopolymer.