Preparation and characterization of phosphate-sludge kaolin mixture for ceramics bricks

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Abstrak

Phosphate Sludge (PS) waste has been a problem in metal surface finishing industry. The waste cannot be dumped in landfill due to the metal content. Valorisation of the waste will be beneficial in a way that it conserves natural reserves and reduces energy consumption. This paper describes the attempt of utilization of PS by mixing it in kaolin in preparation of ceramic bricks. A series of experiments showed that mixtures containing between 25–50 mass % PS sintered at 1200oC attained the highest compressive strength of >25 MPa. X-ray diffractions (XRD) showed that the presence of PS hindered the formation of mullite, the phase that contribute to strength in Al2O3–SiO2 kaolin system. In the mixture of 1:1 kaolin: PS fired at 1200oC, cristobalite was formed, instead of mullite, as observed in the XRD patterns.