

## POTENTIAL OF IGCC SLAG AS AN ALKALI ACTIVATED MATERIAL

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Integrated gasification combined cycle (IGCC) is a next generation energy production technology that converts coal into syngas with enhanced power generation efficiency and environmental performance. IGCC produces coal gasification slag as the solid by-product. Recycling of IGCC slag is still in the early stages, but the recycling process has been around the cement and concrete industry. We calculated the reactive Si/Al ratio of IGCC slag which is generated from a pilot plant in South Korea, and evaluated the potential of it as an alkali-activated material. Samples which were activated with the combined activator of sodium silicate solution and caustic soda had an average compressive strength of 4.5 MPa, showing swelling on the top free surface. Expansion of the alkali-activated slag was possibly caused by free CaO and MgO in the slag. While the samples that were activated with the combined activator of sodium aluminate and caustic soda had an average compressive strength of 10 MPa. Hydroxy sodalite and  $C_3AH_6$  were found to be the new crystalline phases. IGCC slag can be used as an alkali-activated material, but the strength performance should be improved with proper mix design approach which can alleviate the expansion issue at the same time.

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