

## **FERROUS SLAG AND BAUXITE RED MUD APPLICATION FOR CEMENT LESS PRODUCTION**

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**N**ew composite materials were developed from red mud, a residue from bauxite mining, which can be used in several applications such as airfield runways, municipal waste dumps, and production of tiles among others. The composites contain 52 to 78 wt % of red mud with pH value near 13.5, ground cooled ferrous slag (20-45%), and lime production waste (2%). The main objectives of this research were to develop new environmentally efficient solutions for these three solid wastes as valuable components of reusable materials and to study their structure formation processes. Different wet mixes of these three wastes were compacted with a force of 10 MPa to cylindrical shapes of 20x20 mm and hardened at 94 to 96% humidity. The materials had axial resistance strength 1.8, 3.4, 6.2 and 11.2 MPa on the 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup>, and 365<sup>th</sup> days respectively; coefficients of linear expansion ranged between 0.3 and 4.76% and water absorption ranged from 1.8 and 9.31%. The hardening process was monitored by XRD, SEM, EDS, and LAMMA demonstrating that new mainly amorphous formations are responsible for the materials' structure formation. Leaching and solubility tests showed that the new materials meet environmental standards for the intended applications.

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