Clay-bonded Bauxite Refractories: Physical and Mechanical Properties

J.C. Knight and A. Hosein

Abstract

The physical and mechanical properties of model refractory test pieces fabricated from Guyana refractory grade bauxite and the white-burning Valencia clay of Trinidad have been investigated. Specimen were fabricated hydraulic compaction of compositions spanning the range 0 – 95% of the bauxite batched with the clay, followed by firing at processing temperatures of 1200°C and 1300°C. Compared with the control samples (100% clay), addition of up to 10% bauxite effected an initial enhancement in modulus of rupture, compressive strength and fracture toughness. Thereafter, all three parameters varied only slightly with increasing bauxite content up to 50 – 60%, followed by rapid decrease towards relatively low values for higher bauxite contents. Commensurately, apparent porosity increased rather sharply with increasing bauxite proportion above 60%. Inclusive of compressive stress-strain characteristics, the properties displayed correlated with the microstructures developed on firing as the clay/bauxite ratio is varied.