Effect Nano-SiC Additives on Physical and Mechanical Properties of Bauxite Refractories Used in Oil Treatment Units

Abstract- Refractory mixtures were prepared from: bauxite raw materials, grog and Kaolin. Different weight percentage of micro-SiC (5, 10, 15 and 20 wt%) and nano-SiC (2.5, 5, 7.5 and 10 wt%) was added to bauxite mixture to improve the refractories characteristics to suit the lining of oil treatment units. Semi-dry pressing used to forming cylindrical specimens with load (7 ton) and 25 mm in diameter after mixing the powder with 10 wt% Sodium Silicate as a binder. The specimens dried at (110 °C) for (2 h) and fired at (1400 °C) with soaking time (2 h). During firing process, some of nano-SiC powder oxidants and transformed to SiO$_2$ glass phase with increasing mullite phase. Therefore; the bonds with bauxite increases as a result glass phase generated and lead to decreasing the porosity and increasing the shrinkage, density and mechanical properties compared with micro-SiC additives.

Keywords- Refractory, Nano-Ceramic, Silicon carbide, Kaolin and Bauxite.