

عنوان مقاله:

Investigation of the Properties and Microstructure of Direct Bonded Dolomite Refractory with  $Fe_2O_3$ - $Cr_2O_3$  nanoparticles : A Comparative Study

محل انتشار:

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خلاصه مقاله:

In this research, the properties and microstructure of direct bonded dolomite refractory (having) Iron oxide ( $Fe_2O_3$ ) and Chrome oxide ( $Cr_2O_3$ ) nanoparticles have been investigated. For this reason 0, 0.5, 1, 1.5, 2, 2.5 and 3 wt. % of  $Fe_2O_3$  and  $Cr_2O_3$  nanoparticles have been added to the composition. After forming the samples as cylinders ( $50 \times 50$  mm<sup>2</sup>), they were fired in an electric furnace at  $1650^\circ C$  for 3 hr. The measured parameters were bulk density, apparent porosity, hydration resistance and cold crushing strength. Also, microstructural investigation and phase's analysis of the selected samples was performed by scanning electron microscopy (SEM/EDX) and X-ray diffraction (XRD) devices; respectively. Results showed that the use of  $Cr_2O_3$  nanoparticles lead to formation of  $CaCr_2O_4$  and  $MgCr_2O_4$  phases, which improved the sintering process of the samples thorough the solid state sintering mechanism. Also, the use of  $Fe_2O_3$  nanoparticles leads to creating  $CaO.Fe_2O_3$  (CF) and  $2CaO.Fe_2O_3$  (C2F) phases which improved the sintering process of the specimen thorough the liquid phase sintering mechanism. Also, it showed that  $Cr_2O_3$  nanoparticles additive has a greater effect on improving the properties of direct bonded dolomite specimens compared to  $Fe_2O_3$  nanoparticles additive.

کلمات کلیدی:

Dolomite, Refractory,  $Fe_2O_3$ ,  $Cr_2O_3$ , nanoparticles

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