MgO-C reftactories containing nanoadditives: the effect of graphite content and of use modified graphite with Fe and Si.

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Magnesia-carbon (MgO-C) refractories are widely used in basic oxygen furnaces, electric arc furnaces and steel ladles for their excellent corrosion resistance and other important properties.The amount of carbon has crucial role in these properties. Also, the idea of coated graphite seemed to improve corrosion resistance of the MgO-C refractories. This study reports on the graphite content and the use of modified graphite with Fe and Si in MgO-C refractories doped with nanoadditives such as magnesium, aluminum and titanium oxide. The graphite particles first purified and modified with an acid reagent (H_2SO_4/HNO_3 (3:1 v/v)) and then modified with Fe species and Si sources. Sol-gel *method* was applied to synthesize the Al_2O_3 and MgO NPs, whereas a microwave-assisted hydrothermal method via sol-gel process was used for the synthesis of TiO_2 NPs. The NPs were added in raw materials' mixture and in replacing equal amount of MgO fine powder (up to 7 wt.%). Cylindrical specimens with diameter 13mm and 30mm were formed by axial pressing at ~200 MPa and sintering was carried out at 1400 ^oC. The characterization of the produced ceramics showed that the the use of 6 wt.% graphite (than 10 wt.%) resulting in refractory ceramics with higher density, lower porosity as well as higher cold crushing.
The artificial slags had a composition of $56CaO\text{-}11SiO_2\text{-}33Al_2O_3$ (in wt.%). Typical wetting experiments were conducted at the temperature range of 1500-1650 ^oC for 15-120 min. This presentation will present and discuss the results regading the influence of the chemical composition of the ceramics on the interafacial reaction and the refractory behaviour of the produced ceramics.

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