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Studies on Densification, Mechanical, Micro-structural and Structure-Properties Relationship of Magnesium Aluminate Spinel Refractory Aggregates Prepared from Indian Magnesite

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Abstract:

The present work intends to study the development of magnesium aluminate spinel aggregates from Indian magnesite in a single firing stage. The raw magnesite has been evaluated in terms of chemical analysis, differential thermal analysis, thermo gravimetric analysis, infrared spectroscopy, X-ray diffraction. The experimental batch containing Indian magnesite and calcined alumina has been sintered in the temperature range of 1550°C-1700°C. The sintered material has been characterized in terms of physico-chemical properties like bulk density, apparent porosity, true density, relative density and thermo-mechanical/mechanical properties like hot modulus of rupture, thermal shock resistance, cold modulus of rupture and structural properties by X-ray diffraction in terms of phase identification and evaluation of crystal structure parameters of corresponding phases by Rietveld analysis. The microstructures developed at different temperatures have been analyzed by Field Emission Scanning Electron Microscope study and compositional analysis of the developed phase has been carried out by Energy Dispersive X-ray study.

Keywords: Characterization, Sintering, Microstructure, Spinel, Refractories.

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