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ENERGY SAVING AND SERVICE LIFE IMPROVEMENT OF LADLE LININGS USING MICRO PORE ALUMINA AGGREGATE

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The properties of refractories have great effect on the quality of steel, energy consumption and cost of steelmaking. In this paper, the influence of micropore alumina aggregates on the properties of Al2O3-MgO castable used in lade working lining was studied, and the energy saving ladle lining materials were designed. The results showed that the bulk density of Al_2O_3-MgO castable prepared by micropore alumina aggregates was reduced by 7.5%, the strength was increased by more than 40%, the thermal conductivity at 1000 ∏ was reduced by 19%, and the thermal shock stability was increased by one time. When reacting with the Basic Oxygen Furnace (BOF) end slag, the CaO-Al_2O_3 phases were formed and interlaced distributed in the micropores, and a dense layer at the interface of slag and castable was formed which prevented further infiltration and erosion of the molten slag. The Al_2O_3-MgO castable prepared by micropore alumina aggregates was designed as the working lining in the ladle, the light castable as the permanent lining and the nanoporous material as heat insulation lining, the out shell temperature can be reduced to 200 below. The Al_2O_3-MgO castable prepared by micropore alumina aggregates was used in the 300t ladle in Wisco steel, and showed less damaged than the common used castable under the same conditions. Moreover, the microporous corundum aggregates showed good potential to improve the thermal shock stability using in the slab, nozzle and other refractories

Biography

Meijie Zhang has completed her PhD specialized in material science and metallurgy engineering in 2006 from Wuhan University of Science and Technology and senior visiting scholar researches specialized in the new concept of heat transfer from Tsinghua University school of aerospace engineering in 2007. She is a professor of Wuhan University of Science and Technology. She has published more than 50 papers in reputed journals and more than 20 China patents. Her research interests cover mathematical and physical simulation of the application and wear of refractories, preparation of energy saving refractories.

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