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Tytuł angielski

"Computer simulation of the converter refractory lining with using slag splashing method"

Abstract:

This work investigates the factors influencing the slag spraying process during slag splashing. It was found that the effectiveness of used method is determined by two parameters: the surface area of the slag into which the flow is injected and amount of the slag contacted the refractory lining during the spraying process. On the basis of modeling of slag splashing process and physicochemical properties of the slag it was found the following: for high effectiveness of the process, it is necessary to optimize a number of technological parameters, such as, the nitrogen flow rate, the height and angle of inclination of the lance, as well as amount of the slag used during spraying. In addition, it is necessary to take into account the chemical and mineralogical composition of the slag, as well as its physical and chemical parameters. It is important that the slag contains an appropriate mixture of phases with low and high melting temperatures. Low melting temperature phases, containing a high percentage of FeO, provide good adhesion of slag with the worn surface of the refractory lining, in its turn, the phases with high melting temperature provide resilience to chemical and mechanical erosion, as well create an additional thermal barrier. Good adhesion of the slag is achieved when the content of FeO equals 13%, and the saturation of MgO exceeds 8%. Increased MgO content facilitates formation complex of MgO and Fe₂O₃, thereby eliminating the formation of low-alloyed calcium ferrites. On the basis of calculations and simulations the factors influencing the adhesion and homogeneity of the formed layer of sprayed slag were determined. The problems considered in this work have been solved in several stages using our own and commercial design programs, as well as with the use of industrial and laboratory researches.