

Smelting Reduction of Chrome Ore: Towards Chromium Recovery and Energy Saving

(B. Bhoi, Sunita Routray & A. K. Jouhari)

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Abstract

The present crude steel production in the world is 1400 million tones per annum out of which the present production in India is 63 million tones. India is aiming at 200 million tones production of steel by 2020. The rapid industrialization for steel plants in India, especially in Orissa, demands lot of energy requirement. Since the state of Orissa rich in chrome and iron ores, ferro-chrome industries are coming up even by small and medium scale industrialists. The ferro-chrome industry is energy intensive industry for which the electrical energy required is in the order of 3300-3400 kWh to produce one tone of high carbon ferro-chrome. Based on the installed capacities of ferro-chrome industries in Orissa, it is estimated that the electrical energy consumption is an enormous. In this paper efforts have been made to get the maximum yield and to minimize the Chromium loss in slag. The influence of Cr₂O₃ content / FeO content in slag, basicity of the slag and the amount of reductant on recovery of chromium has been studied. This paper also deals with the laboratory scale study in induction furnace to cut down the electrical energy in SR process. It is observed that by introducing coke on top of the molten bath and injecting oxygen at 2 l/min for a period of 5-10 minutes, a reduction in electrical energy of about 30% is achieved.