AN ATTEMPT AT OPTIMIZING THE FLOW CHARACTERISTICS OF BLAST FURNACE SLAG BY INVESTIGATION WITH SLAG OBTAINED FROM BLAST FURNACE OF ROURKELA STEEL PLANT, SAIL

A THESIS SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENT FOR THE DEGREE OF

Bachelor of Technology
in
Metallurgical and Materials Engineering

By

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CERTIFICATE

This is to certify that the thesis entitled, "**An attempt at optimising the flow characteristics of Blast Funace Slag by investigation with slag obtained from Blast Furnace of Rourkela Steel Plant, SAIL**" submitted by **Pallabi Patnaik (10604030)** and **Shivani Kishor Dumpawar (10604017)** in partial fulfillments for the requirements for the award of **Bachelor of Technology Degree** in **Metallurgical and Materials Engineering** at National Institute of Technology, Rourkela is an authentic work carried out by them under my supervision and guidance.

To the best of my knowledge, the matter embodied in the thesis has not been submitted to any other University/Institute for the award of any Degree or Diploma.

Date:

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ABTSRACT

Due to the softening-melting of the burden in the cohesive zone of the blast furnace, the ore layer becomes compacted and the gas passes predominantly through the sandwiched coke layer known as coke slits. For improved productivity and reduced coke rate, it is required to minimize the size and lower the position of the cohesive zone in the blast furnace. This work is designed by arriving at a slag composition through actual experimentations which will ensure the lowering of the cohesive zone of the blast furnace with simultaneous decrease in the difference between the softening temperature (ST) and flow temperature (FT) of the slag. Slag samples from SAIL, Rourkela were collected and their flow characteristics were measured using the heating microscope. With the same composition as obtained from the steel plant, a synthetic slag was prepared in the laboratory using pure oxides, by another group. It was melted to 1600 ℃ and then water quenched to form the glassy state. Flow characteristics for the same were also determined. The flow characteristics data of Blast Furnace slag were compared with that obtained from synthetic slag. All the slag samples were sent to DISIR, Rajgangpur for slag analysis as well as to determine the mineralogical phases present in them, for which the slag samples were heated to 1500 ℃ followed by slow cooling to convert them to crystalline form. Then, XRD analysis was done to determine the mineralogical phases. Finally, with relevant phase diagram study, we arrived at a composition which will ensure the lowering of cohesive zone.

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