

Reduction Conditions of Briquetted Solid Wastes Generated by the Integrated Iron and Steel Plant

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Abstract : Iron oxides are the main input to produce iron in integrated iron and steel plants. During production of iron from iron oxides, some wastes with high iron content occur. These main wastes can be classified as basic oxygen furnace (BOF) sludge, flue dust and rolling scale. Recycling of these wastes has a great importance for both environmental effects and reduction of production costs. In this study, recycling experiments were performed on basic oxygen furnace sludge, flue dust and rolling scale which contain 53.8%, 54.3% and 70.2% iron respectively. These wastes were mixed together with coke as reducer and these mixtures are pressed to obtain cylindrical briquettes. These briquettes were pressed under various compacting forces from 1 ton to 6 tons. Also, both stoichiometric and twice the stoichiometric cokes were added to investigate effect of coke amount on reduction properties of the waste mixtures. Then, these briquettes were reduced at 1000°C and 1100°C during 30, 60, 90, 120 and 150 min in a muffle furnace. According to the results of reduction experiments, the effect of compacting force, temperature and time on reduction ratio of the wastes were determined. It is found that 1 ton compacting force, 150 min reduction time and 1100°C are the optimum conditions to obtain reduction ratio higher than 75%.

Keywords : Coke, iron oxide wastes, recycling, reduction

Conference Title : ICMIME 2016 : International Conference on Manufacturing, Industrial and Materials Engineering

Conference Location : Lisbon, Portugal

Conference Dates : April 14-15, 2016