Technological Challenges on Low Grade Iron Ore Beneficiation and Pelletisation

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Iron ores are valuable natural resources being finite and non-renewable. They constitute the vital raw materials for iron and steel industries and are a major resource for national development. As per the National Steel Policy of Govt. of India, steel production will be enhanced to 300 MTPA in 2030-31. It needs the high-quality ore around 450MTPA. The country is not endowed with high grade requisite iron ore resources. It is, therefore, imperative to achieve the best use of available low and lean grade iron ore resources through scientific methods of beneficiation and pelletisation. Challenges and solutions for upgrading Indian low grade goethetic-hematite iron ore in association of goethite, kaolinite, gibbsite minerals should be taken seriously to maximize the utilization of these resources for long term sustainability by using suitable eco-friendly beneficiation process through R&D backup. Both physical and reduction roasting process of beneficiation of low and lean grade ores should be exploited and maximized the iron recovery.

To utilization of micro-fines concentrate from beneficiation process, pelletisation is the alternative method. The Indian hematite iron ore concentrate has high LOI because of the presence of kaolinite, goethite and gibbsite even after beneficiation process. As this one is in fragile nature, the Blaine number of pellet feed material is high. To maximize the iron values from the slimes and tailings, reverse flotation process may be adopted in future. It may change the surface properties of the particles. It is the challenging task to handle the iron ore concentrate having high LOI, high Blaine number. It needs to improve the heating cycle of induration segment of the present pelletisation technology either grate kiln or straight grate processes through fundamental studies.

Keywords: Low and grade iron ores, beneficiation, pelletisation, Iron recovery

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