

Beneficiation of Low Grade Banded Iron Ores

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Abstract

In the upcoming decades, low grade iron ores are going to be the relative substitute for calibrated and high grade iron ores as per the increasing demand of steel in India. Banded Hematite Quartzite (BHQ) and Banded Magnetite Quartzite (BMQ) are the low-grade iron ores. These ores can not be directly used for production of iron metal without required up-gradation due to the limitation of present smelting/direct reduction technologies. Recently, the cut-off grade of iron ore has been re-fixed by Government of India to lower level of about with the depletion of current high grade deposits of India. These resources can be used to extract the iron values in an economical process after suitable physical beneficiation.

In the present investigation, beneficiation studies were carried out on two BHQ samples where one of the samples was associated with less quantity of BMQ. The iron ore samples were collected from Rairangpur area, Odisha. Sample 1 contains BHQ and Sample 2 contains both of BHQ and BMQ. Detail mineralogical studies on both the samples were carried out. The liberation size of iron phase minerals in both the cases was below 50 microns. Both the samples were subjected to the required beneficiation processes. The studies indicated that, the Fe value of Sample 1 can be upgraded to 57.13% with a yield of 28.09%, whereas that of Sample 2 can be upgraded to 60.8 % with 24% yield.

Keywords: BHQ; BMQ; cut-off grade; liberation size; beneficiation process.