

# Manganese Ore Mineral Hand Specimen Analysis Special Reference to Kajalidongri Mines Meghnagar, Jhabua District, M.P

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**Abstract:- Manganese ore with reference of hand specimen ore mineral study of Kajalidongri Mines Jhabua district Madhya Pradesh. All the above minerals are normally associated with Gondite. The Gondites scarcely exhibit good schistosity and the minerals generally do not have any linear arrangement. In Gondites, braunite, rhodonite, and other manganese silicates are often interbanded with quartz or manganese oxides minerals. Such bands of Gondites often exhibit small scale folds. Certain bands are composed of rhodonite or spessartite and veins from such rhodonite bands often transgress the other bands. The manganese amphiboles and the micas are mostly aligned in bands and they rarely impart a foliated appearance to the Gondites.**

**Keywords :- Series, Gondite, Manganese, Ore Minerals.**

## I. INTRODUCTION

The deposit of manganese ore in Kajalidongri manganese mine is of residual nature or special type of pocket deposit spread in area of 30.86 Hectare the mineralization in the area is associated with manganiferous quartzites as reef deposits having north - south strike. The dips of the ore body varies from 60<sup>0</sup> to 70<sup>0</sup> towards west average being 65<sup>0</sup>. A mineral hand specimen study of representative samples is given herewith in order to description only physical characteristic properties of the minerals.

## II. MANGANESE ORE HAND SPECIMEN STUDY OF SAMPLE

### ➤ *Pyrolusite*

Pyrolusite is a manganese dioxide (MnO<sub>2</sub>) crystallized in tetragonal system. It occurs rarely in prismatic crystals elongated parallel to 'C' axis, by far most common, it occurs as reniform sooty masses. The delicate dendritic tracers found in narrow seams in all kinds of rocks are usually pyrolusite. It usually spoils the fingers during handling because of low hardness 2 - 2.5. It is normally iron black dark steel grey crystals with streak black. (Figure 1)

### ➤ *Rhodonite– [(Mn Ca fe) SiO<sub>3</sub>]*

It is triclinic pyroxene with Mn 35.86 %. Tabular crystals are common but in some cases massive and

characterized by red coloured with perfect cleavage, crystals are large and rough with edges. (Figure2)

### ➤ *Spessartite*

This is a manganese garnet with chemical composition (Mn<sub>3</sub> Al<sub>2</sub> Si<sub>3</sub> O<sub>12</sub>). Colour of the minerals is honey yellow, brown, brownish black with rhombohedral habits of the crystals. (Figure 3)

### ➤ *Winchite*

It varies from a very beautiful sky blue, to lilac or almost violet in colour it is in the form of the needle or stampy blades. (Figure 4)

### ➤ *Rhodocrocite*

This is a manganese carbonate with chemical composition MnCO<sub>3</sub>. It has hexagonal habit but not commonly forms crystals. Usually it occurs as massive globular with perfect cleavage. It has pale grayish colour with medium specific gravity. (Figure 1)

### ➤ *Blanfordite*

It occurs as large porphero blasts due to replace most of other silicate and very often by pyrolusite and cryptomelane. It is considered to be a manganiferous arginine augite of amphibole family. (Figure 3)

### ➤ *Hollandite*

It is crystalline, massive, fine grained and has silver colour with metallic luster. It occurs as fibrous to coarse radial masses. It crystallizes in tetragonal prismatic habit. (Figure 2)

### ➤ *Braunite*

Braunite was first named by Haidinger (1931). It has chemical composition 3 Mn<sub>2</sub>O<sub>3</sub> Mn SiO<sub>3</sub> and crystallises in tetragonal system. It is commonly massive, granular; fine to coarse grained and is typically brownish black to black. Cleavage is perfect with black streak and finely powdered. (Figure 4)

### ➤ *Jacobsite*

Jacobsite, first described from jacobsonberg of Sweden. It is member of isometric spinel group having a general formula MnFe<sub>2</sub>O<sub>4</sub>. Jacobsite is strongly ferro magnetic. It gives shiny black colour, with a distinctly greenish cast. The grains of jacobsonite are medium to coarse grained with good cleavage. (Figure 1)

➤ *Psilomelane*

Psilomelane was first named by Haidinger (1831) for high grade hard manganese ores of botryoidal layered structure and colloform or stalactitic structure found in line of cavities it has iron black to steel grey colour and is characterized by shining brownish black streak and high specific gravity 5 – 6. (Figure 4)

➤ *Bixbyte*

It is first described and named by Penfield and Foote (1897) from Thomas Range, Utah U.S.A. On the other hand Fermor (1909) described it from regionally metamorphosed sedimentary manganese ores of India, named as sitaparite. It has chemical composition  $(\text{MnFe})_2\text{O}_3$  and crystallise in cubic system. It generally occurs in perfect cubic crystals. It is black, semi metallic mineral with bronze coloured lusture. (Figure 1)

➤ *Hausmannite*

Hausmannite has chemical composition of  $\text{Mn Mn}_2\text{O}_4$ . It crystallises in tetragonal system. Cleavage is perfect and uneven fracture. It has brownish / black colour and chestnut – brown streak. (Figure 3)

All the above minerals are normally associated with Gondite. The Gondites scarcely exhibit good schistosity and the minerals generally do not have any linear arrangement. In Gondites, braunite, rhodonite, and other manganese silicates are often interbanded with quartz or manganese oxides minerals. (Figure 1,2) Such bands of Gondites often exhibit small scale folds. (Figure 4) Certain bands are composed of rhodonite or spessartite and veins from such rhodonite bands often transgress the other bands. (Figure 2,3). The manganese amphiboles and the micas are mostly aligned in bands and they rarely impart a foliated appearance to the Gondites.

### III. FIGURE

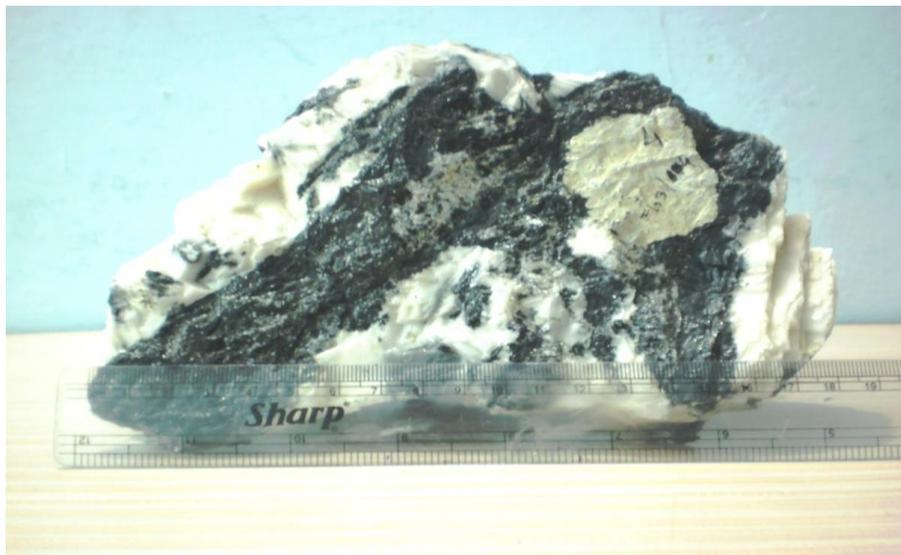


Fig 1:- Photograph showing alteration of Gondite to secondary pyrolusite and cryptomelane.



Fig 2:- Photograph showing hollandite, rhodonite and winchite in gondite rock



Fig 3:- Photograph showing braunite in Gondite with quartz, mica, schist.



Fig 4:- Photograph showing micro folding in Gondite with manganese ore.

#### IV. CONCLUSION

Geology of manganese ore with reference to India vis-a-vis megascopic ore mineral study of Kajalidongri Manganese Mines Jhabua district Madhya Pradesh. Main three types of manganese ore reported from belts of the country they are:

1. Deposits associated with Precambrian metamorphic rocks of Gondite type.
2. Deposits associated with Precambrian metamorphic rock of kodurite type.
3. Lateritoid deposits in surficial concentration mineralization extending into the underlying rocks.

According to Fermor, S.Roy, Stanton and Hewet the manganese ore deposit occur in all geological formation extending from Pre-Cambrian, Paleozoic and Mesozoic to the Tertiary rock but the most Pre-Cambrian and Tertiary rock.

The main manganese ores are residual, hydrothermal and few from sedimentary origin. Fermor (1919) has stated that some manganese ore deposits are resulted due to regional metamorphism of carbonate rock.

The documented manganese ores are hollandite, blanfordite, winchite, braunite, pyrolusite, manganite,

psilomelane, cryptomelane, rhodonite, rhodochrosite, bixbyite, Hausmannite, jacobsonite, spersartite and piedmontite pegmatite in the area studied.

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