

Petrogenetic indicator for metamorphic evolution of the manganese mineralization from the zoned spessartine garnets, Chikla Manganese deposit, Sausar Group, Central India

PRITIMAYEE BARIK¹, PRABODHA RANJAN SAHOO¹, SAHENDRA SINGH¹ AND SANJOY KUMAR SARKAR²

¹Indian Institute of Technology (Indian School of Mines) Dhanbad

²Manganese Ore India Ltd.

Presenting Author: barik.pritimayee@gmail.com

The Munsar Formation of Sausar Group, Central India hosts a wide range of manganese ore minerals with a dominated braunite phase. The Mn ores in this belt have evolved from the metamorphism of the Mn-rich sediments during the regional metamorphism. During the petrography and EPMA studies of the manganese ores from Chikla mines, the metamorphic relationship could be clearly observed from the occurrence of spessartine garnet within the rhodonite. Further, the occurrence of relict rhodonite and braunite within the spessartine garnet clearly suggests the metamorphic evolution of the Mn ores. Rhodochrosite was also observed in the near vicinity of the spessartine garnet. The CaO content of these spessartine garnets varies from 2.46-2.64% which suggests that the CaO content of the rhodonite was retained in the spessartine during the metamorphism and excess CaO was precipitated as rhodochrosite. Precipitation of silica at the boundary of the spessartine also indicated the metamorphic origin and release of excess silica from the reactants. From the EPMA-BSE image along with X-ray mapping of the garnet shows the zoned nature of the spessartine garnet with higher concentration of Mn at the peripheral part suggesting the sequential growth of the garnet during the prograde metamorphism.

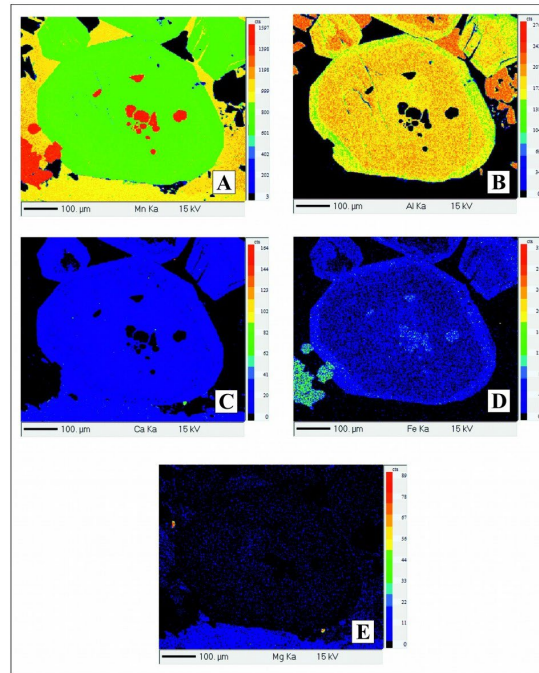


Figure 1 shows EPMA X-ray mapping of Mn, Al, Ca, Fe and Mg in the zoned spessartine garnet.

Table 1. Quantitative core to rim results of EPMA analyses on zoned spessartine garnet.

Analysed points	Point Element (wt%)				
	Mg	Fe	Al	Ca	Mn
1 (core)	0.036	6.93	0.095	0.042	54.52
2	0.26	2.49	9.33	1.886	29.39
3 (rim)	0.1869	4.026	8.56	1.758	30.17
4 (outside of zone)	0.259	0.0466	0.0423	0.0357	37.259