Automated Optical Image Analysis of Low Grade Iron Ores

E. Donskoi, A. Poliakov, S. Hapugoda and J. R. Manuel

1. Corresponding author: Project Leader, Mineral Processing Modelling, CSIRO Mineral Resources, PO Box 883, Kenmore QLD 4069, Australia. Email: Eugene.Donskoi@csiro.au

2. Senior Experimental Scientist, CSIRO Mineral Resources, PO Box 883, Kenmore QLD 4069, Australia. Email: Andrei.Poliakov@csiro.au

3. Process Mineralogist, CSIRO Mineral Resources, PO Box 883, Kenmore QLD 4069, Australia. Email: Sarath.Hapugoda@csiro.au

4. Project Leader – Ore Characterisation, CSIRO Mineral Resources, PO Box 883, Kenmore QLD 4069, Australia. Email James.Manuel@csiro.au

ABSTRACT

The complexity of recently developed iron ore deposits is increasing in comparison with those developed only 20-30 years ago. The deposits previously considered as not economically viable due to higher levels of gangue material are now starting to be developed.

To optimise the processing/beneficiation procedures a detailed characterisation of such ores is needed, including mineral liberation, association and textural classification. Identification of different iron oxides and oxyhydroxides is already reliably performed by optical image analysis (OIA). Automated OIA identification of different gangue materials, and particularly quartz, can be problematic though.

The article demonstrates the capability of CSIRO OIA software Mineral4/Recognition4 to characterise low grade iron ores. Such characterisation includes identification of different types of goethite, hydrohematite and gangue materials such as quartz and kaolinite. XRD and XRF analysis results are compared with those from OIA. The article also discusses the peculiarities of textural classification for such ores.