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# Field and Petrographic Aspects of Kolomela Iron Ore Deposit, Postmasburg, South Africa and their Genetic Significance

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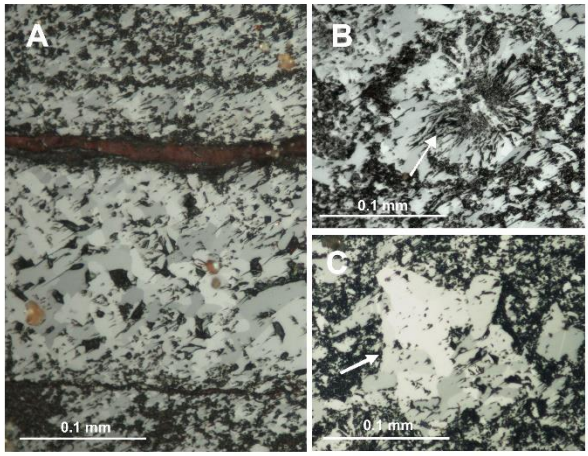
A shallow marine succession of sandstone, shale, stromatolitic dolomite, banded iron formation and iron ore with intermittent strike parallel lenticular breccia horizons constitute the Campbell Rand and Asbestos Hills Subgroups of Ghaap Group of Transvaal Supergroup of Kolomela mine area. The breccias with angular clasts of boulder to sand sizes of banded iron formation, dolomite and iron ore with clast to matrix-supported fabric point towards a mass-flow origin. Emplacement of such breccias might have been triggered by synsedimentary intrabasinal/basin marginal faults. The occurrence of breccias above stromatolitic dolomite indicates enhancement of substrate gradient, possibly associated with development of intrabasinal faults and the breccias are developed as fault-apron deposits. Emplacement of hematite veins along fractures and replacement of dolomite, silicate and carbonate facies banded iron formation in all possible scales is evident. Breccias, at several places, are partly or completely replaced by hematite. Intensity of hematitization is higher near the base of




such breccias. Observation in microscopic scale reveals replacement of thinly laminated dolomite with other allochems like ooids by cryptoplaty or microplaty hematite. Extensive replacement of this kind

yielded laminated ore. Recrystallization of such early (primary) hematites produced large equant hematite grains. Passage of oxidized iron-rich fluid along and across the lamination in laminated ores caused deformation and brecciation. Such expulsion of geopressurised fluids through laminated iron ore, caused hydrothermal brecciation and developed grains for granular iron ores, an important component of Kolomela ore. Roundness in some grains might have been developed during transportation of the grain mush for some distance. Absence of matrix in intergranular spaces of granular ores advocate in favour of intrastratal transport.

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The evidence outlined above clearly suggests a hydrothermal replacement origin for iron ores at

*A. Photomicrograph of laminated ore showing carbonates replaced by crypto and microplaty hematite, replacement is guided by early laminations of dolomite.*

*B. Photomicrograph showing replacement of ooids by microplaty hematites.*

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*B. Photomicrograph showing replacement of ooids by microplaty hematites.*

*C. Photomicrograph showing recrystallization of microplaty hematite to produce large equant hematite grains.*

Kolomela. Granular ores are a product of hydrothermal brecciation of early laminated ore and breccia ores are results of extensive replacement of fault-breccias by iron-rich oxidizing fluid. The faulting may have been connected to low angle thrusting developed in this area (Altermann and Hälbich, 1). The faults might have acted as conduits for migration of iron-rich basinal fluids.

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Reference:

[1] Altermann W and Hälbich I W (1990) *S Afr J Geol* 93(4): 553-566.