

CHARACTERISATION OF IRON ORE SINTER BY OPTICAL MICROSCOPY AND EPMA

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ABSTRACT

The mineralogy and texture of iron ore sinters play an important role in determining their physical and metallurgical properties. Identification and characterisation of sinter phases is, therefore, a cost-effective and complementary tool to conventional physical and metallurgical testing of iron ore sinter in evaluating and predicting sinter quality. Over the years, CSIRO has developed a scheme for characterising iron ore sinter which classifies primary and secondary sinter phases including various types of SFCA; primary, secondary haematite and magnetite; glass; larnite and remnant fluxes. Correct identification of these sinter phases using optical microscopy is crucial for quantification of these phases by manual point counting under a petrographic microscope, automated optical image analysis, quantitative XRD and SEM techniques. Analysis of sinter phases by EPMA has helped to identify minor chemical differences in major sinter phases, particularly various SFCA types. Sintners were prepared from blends of varying chemistry and characterised using optical microscopy and EPMA. Distribution of sinter phases and abundance of mineralogical-textural sinter types can be used as an additional tool to explain the metallurgical properties of sinter.

Keywords: iron ore, sinter, mineralogy, phase quantification, EPMA