Better resource characterization across BHP mines through infrared spectroscopy

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Infrared spectroscopy applied to minerals exploration has seen enormous advances in the last few years, enabling the mining industry to use infrared spectroscopic data throughout the mining value chain to improve material characterisation.

This is an account of the successful journey of advancing infrared spectroscopy in the mining business that has become an invaluable method to help improve on cost and product quality across the different assets operated by BHP. Accurately identifying mineralogy derived from infrared spectra is a key input for geoscience tasks such as drill hole logging, geology modelling and the understanding of ore quality.

Infrared spectroscopic data is routinely collected and automatically processed to deliver semi-quantitative mineralogy to help with geological logging, interpretations, modelling, understanding of geological processes and prediction of physical variables (metallurgical, ore flow and geotechnical properties). Mineralogy classification enhances the understanding of ore characteristics to improve processing, beneficiation and product differentiation by attributes, which go beyond grade and quality.

BHP is investing in seamless infrared spectroscopic sensing across the value chain to better predict downstream performance, understand cost-effective beneficiation options, and to improve on materials handling, processing and output control. Knowledge gained in one commodity can be easily transferred to other parts of the business. This paper explores the current application of infrared spectroscopy at various stages of the mining value chain and potential future applications across BHP assets.

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