

# SEG 2022 Conference: Minerals For Our Future

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## Improved Measurement for Processing of Critical Minerals

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Application of innovative measurement technologies maximises the processing and recovery of critical resources. Improvements in process control require appropriate measurements that are representative, real time and precise. High specification prompt gamma neutron activation analysis (PGNAA) for elemental analysis and microwave transmission for moisture analysis have been successfully applied in many key commodities because they fully penetrate conveyed flows and measure continuously irrespective of particle size, belt speed, dust, and layering and segregation within the flows. Applications in iron ore, manganese, copper, cobalt, nickel, lead, zinc, bauxite, gold, silver, PGMs and lithium have improved processing through coarse waste rejection, blending, feed forward control, and monitoring quality of ores and products. The same technologies are used in recycling and are particularly suited to scrap metals, e-waste and black mass. Analysis of these materials enables batches of similar materials to be more efficiently processed and minimises product contamination. Highly customisable configurations provide high precisions over short analysis times and therefore fast responses. Measurement of moisture allows dry tonnage determination, better control over dust, and identifying potential handling issues where material is sticky or clumps easily due to clay or organics content. Efficient processing and quality management reduces the resources needed to process the materials and generates greater recoveries at lower cost. The paper provides examples of the applications in critical minerals and examines some benefits through the use of geometallurgy and sensor fusion in predicting process impacts as feed quality changes.