

Mineralogical and elemental characterization of graphite



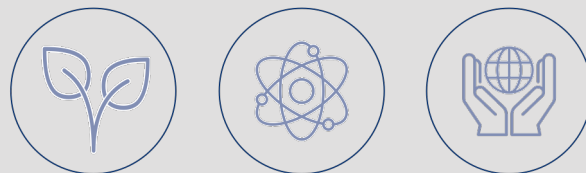
X-ray Mineral Services (XMS) recently conducted comprehensive analytical work for the characterization of graphite varieties, impurities and provenance.

Our **META** (Minerals, Elements, Texture and Analysis) service is a comprehensive materials characterization workflow. The META workflow deployed in this study incorporated XRD, FTIR, ICP and XRF techniques. This study included samples from three different locations; Sri Lanka, Northern England and Tanzania.

Bulk mineralogy was quantified by XRD. Whole rock and clay fraction analysis were conducted, and mineral quantification was completed using the Rietveld method with Autoquan software, with most minerals quantified within 2 wt.% absolute error.

XRD successfully determined the proportion of hexagonal and rhombohedral forms of graphite, their associated mineralogy and impurities from each location. The graphite content and bulk mineralogy could also be rapidly characterized using FTIR data demonstrating the potential of an onsite analytical capability.

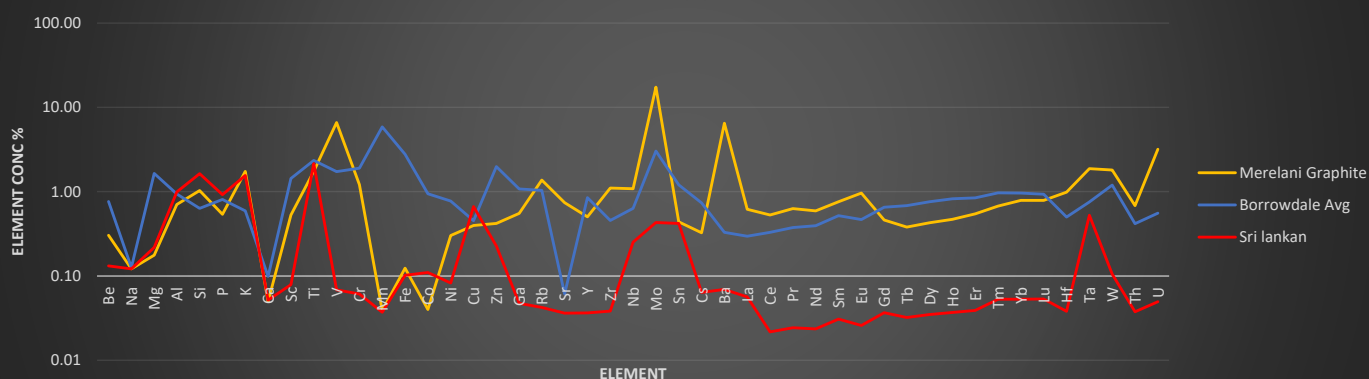
ICP and XRF data were used to characterize the geochemical composition of each graphite type. Spider diagrams were used to highlight subtle variations in geochemistry that can be used to identify each graphite deposit and these impurities can be linked to provenance and paleo environment.



Graphite ore sample originating from Tanzania

XMS has developed a robust graphite characterization workflow capable of grading graphite ores and defining fingerprints that can be used for the traceability of ores originating from different sources.

Elemental enrichments - Merelani, Sri Lankan & Borrowdale Graphite (norm to Upper Crust)



Spider diagram showing distinct differences in elemental signature from three different deposits



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