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Geochemical Data: a Critical Element in Geometallurgical Studies

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Geometallurgy, also known as geomet or orebody knowledge, is a cross-disciplinary field of geoscience and engineering that has become established over the past decade. Historically, the fields of mineral exploration, mining, and processing would be generally understood by geologists, mining engineers, and metallurgists, and knowledge would be shared among small teams involved in resource development and production. More recently, science and engineering have become more and more specialized and diversified, leading to siloing in universities and industry, and a dissociation of exploration geosciences from mining operations. This knowledge gap has grown to the point that a bridging discipline is now required to reconnect the disparate functions through designated teams of subject-matter experts using a common language. Mineral processing is primarily affected by mineralogy, which dictates grade, hardness, material handling, metal deportment, and recovery parameters. However, detailed mineralogical data are usually only acquired in small volumes of metallurgical or environmental testwork, or in the very early stages of exploration. High quality multi-element geochemical data are more commonly available for thousands of drill-hole intervals, providing the closest approximation of an orebody's mineral composition. In combination with appropriate metallurgical and environmental testwork, such geochemical data can play a critical role in the development of geometallurgical domains for resource models and in generating proxies for key indicators of ore-processing performance, tailings composition, and waste characterization.