

Correlating Process Mineralogy and Pulp Chemistry for Quick Ore Variability Diagnosis.

B. Amankwaa-Kyeremeh¹, C. Greet², W. Skinner³ and R.K Asamoah⁴

1. PhD student, University of South Australia, Adelaide, SA 5095. bismark.amankwaa-kyeremeh@mymail.unisa.edu.au:

2. Manager Metallurgy, Magotteaux Pty Ltd, Adelaide, SA 5095. christopher.greet@magotteaux.com:

3. Research Professor, University of South Australia, Adelaide, SA 5095. william.skinner@unisa.edu.au:

4. Post-Doctoral Fellow, University of South Australia, Adelaide, SA 5095. richmond.asamoah@unisa.edu.au:

Abstract

Froth flotation is a mineral separation technique that treats millions of ore tonnages around the globe annually. Factors such as mineralogical composition as well as galvanic interactions between minerals surfaces and grinding media are known to control and affect the selectivity efficiency of the process. To understand these interactions, pulp chemistry information such as pH, pulp potential (E_h), dissolved oxygen (DO), oxygen demand (OD), and temperature (T) could be of great use. This work focusses on unravelling potential relationship between pulp chemistry parameters (pH, E_h , DO, OD, T) and pyritic sulphide minerals using statistical approaches. Industrial time stamped pulp chemistry parameters (pH, E_h , DO, OD and T) and their corresponding elemental assay values of copper (Cu), iron (Fe) and sulphides (S) were used to develop models. Results revealed some level of association (linear and nonlinear) between pulp chemistry parameters and selected sulphide minerals of the ore. This results give room for improved process prediction based on pulp chemistry, a potential diagnostic tool for quick detection of ore variability.

Keywords: Mineralogical variation, Flotation, Pulp chemistry