

AN EVALUATION OF THE APPLICATION OF X-RAY MICROSCOPY IN UNDERSTANDING GOLD LOSSES IN TAILINGS

*Shaun Graham¹, C. Brough²

1. Carl Zeiss Microscopy, 2. Petrolab Limited C Edwards Offices

The extractive metallurgy of gold is largely controlled by mineralogical factors such as the presence of refractory gold, particle size, gangue mineral associations, presence of preg-robbbers, oxygen and cyanide consumers, and locking characteristics in base metal sulphides.

Light microscopy and automated mineralogy techniques are regularly used to characterise the effect of these variables on gold recovery. However, despite their widespread application there are a range of limitations when grades are low. Typically, the analysis of low-grade samples requires the preparation and analysis of numerous polished blocks. This is often costly and time consuming, with complexities regarding analysing statistically representative particle quantities and problems overcoming stereological bias. This is compounded by the “nugget” effect and high tenor nature of gold mineralisation.

X-ray Microscopy techniques have the potential to overcome many of these problems, in particular the statistical representivity of analysis, removing stereological bias and effectively locating phases that are present in ultra-trace proportions. In this paper we outline the potential benefits of employing X-ray Microscopy (XRM) in characterising gold losses from a typical Cu-Au porphyry project, which were illusive in 2D based analysis. The talk will also outline additional application areas of XRM within the extractive value chain.