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Coupling tomography techniques for ore characterisation in leaching studies

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To date, the heap leaching technology has been lacking fundamental understanding of these inter-related processes mainly because of ore variability and limited characterization tools. The roles of mineralogy, particle size distribution, and the interaction between comminution techniques and heap leach performance are all of significant importance towards improving current processes. Furthermore, advanced characterisation of these processes will also allow greater control of acid rock drainage from waste rocks. However, existing technologies to process these ores are out-dated and stagnant. A new area of fundamental characterisation technologies involving Computated tomography have recently garnered significant interest with applications in geosciences. Particularly, X-ray Computated tomography (XCT) allows nano-scale determination of the nature of large particles and the reactions they undergo during heap leaching to provide change to porosity, pore densities and nano-fractures. Simultaneously, recent advances in Positron Emission particle Tomography (PEPT) to map fluid flow in sedimentary rock systems has also received attention.

In the current study a selected ore particle will be characterised extensively by XCT to map the potential pore spaces that exist within these particles and the influence of gangue and textures on these spaces. PEPT will be subsequently used to calculate fluid saturation and distribution within the selected ore particle during leaching. The combination of these two high resolution techniques will provide comprehensive *in-situ* characterisation of the mechanisms that occur, both at the solid-liquid interphase at the surface and the pore spaces within the particle; in real time during leaching.