Effect of ultrasonic cavitation in the acid leaching process

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**Abstract**

The leaching process consists in the release of chemicals in a liquid phase, that can be either a acid or a basic solution. Acid leaching is used in metal extraction from ores in metallurgy or from scraps in recycling. The process consists in two main steps: contact between the solid and the leaching solution, and the separation of the desired substance that is transferred to the liquid phase. To be transferred to the solution, the substance of interest must move across the boundary layer that forms around the particle. In general, leaching times are in the order of hours and require special handling of the solution due to the harsh acids employed (most commonly sulfuric acid). Ultrasonic cavitation is a well-known process intensification tool. The collapse of the bubbles generates micro-jets and shear forces that improve mixing and transport properties in the liquid phase. The presence of solid particles in the liquid phase influences the formation of bubbles, as the particles can offer heterogeneous nucleation sites, enhancing the overall cavitation activity. This work aims to study the effect of ultrasonically-induced cavitation combined with acid leaching on solid particles. This will be achieved by comparing the size and morphology of solid lithium oxide particles after ultrasonically-enhanced and regular acid leaching.