

EFFECT OF REACTION TEMPERATURE ON SCHWERTMANNITE SYNTHESIS, FROM SIMULATED COPPER HEAP LEACH SOLUTIONS

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ABSTRACT

The work here, examines the effects of the reaction temperatures (25°C and 65°C) and co-existing metal ions (Cu²⁺ and Fe²⁺) on schwertmannite, synthesized from the simulated copper heap leach solutions. It is observed that, schwertmannite can be synthesized at both 25°C and 65°C, from all the experimental conditions, excepting for the solution containing 100 mM Fe²⁺ at 65°C, as goethite is generated under these conditions. Schwertmannite products, synthesized at both temperatures have similar chemical compositions; however, they differ in surface characteristics. The specific surface area of the schwertmannite, synthesized at 65°C was much larger (147.4–176.9 m² g⁻¹) than the specific surface area of the schwertmannite, synthesized at 25°C (14.1–21.4 m² g⁻¹). The efficiency of As(V) removal from acidic aqueous solutions (pH 3-4), by the synthesized products were also investigated. The results showed that, the maximum As(V) sorption capacities of the schwertmannite, synthesized at 65°C was much higher (114-128 mg g⁻¹) than the maximum sorption capacities of the schwertmannite synthesized at 25°C (17-23 mg g⁻¹).

KEYWORDS: Schwertmannite; Temperature; Copper Heap Leach Solution & As(V) Sorption