

## Model for Predictive Analysis of Residue Lead Content During Leaching of Galena by the Oxidative Action of Acidithiobacillus Ferrooxidans

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(Received March 28, 2011; Revised June 08, 2011; Accepted June 14, 2011)

A model for predictive analysis of the lead content of residue during bioleaching of galena has been derived. The leaching solution was inoculated with acidithiobacillus ferrooxidans which oxidatively catalyzed the process. The established model:

$$\Phi_R = \left( \frac{\beta_R}{0.0449 \beta_i} \right)$$

indicates that the mass of lead in the residue resulting from the bioleaching process is directly proportional to the ratio of percent concentration of lead in residue to percent concentration of lead in the as-beneficiated concentrate ( $\beta_R/\beta_i$ ), the associated correlation being precisely unity. The validity of the model is rooted in the expression  $\phi_i \beta_R \approx \beta_i \phi_R$ , both sides of the expression being correspondingly approximately almost equal. The mass of lead per unit time sipping into the reaction residue during the bioleaching process as obtained from experiment and derived model are 0.0036 g/hr and 0.0038 g/hr. This is an indication of proximate agreement between experimental and model-predicted results. The deviation of the model-predicted mass of lead (sipping into the residue) from the corresponding experimental values is approximately 4.5% all through the leaching process.

**Keywords:** Model, Residue Lead Content, Acidithiobacillus Ferrooxidans, Leaching, Galena.