One Novel two-step Bio-Oxidation Pretreatment of Arsenic-Containing Gold-Bearing Concentrate

Ye Zheng^{1,2}, Dezhou Wei^{1,*}, Wengang Liu^{1,*}, Hao Duan¹, Shijie Zhou¹

¹ School of Resources and Civil Engineering, Northeastern University, Shenyang 110819, Liaoning, China

² Changchun Gold Research Institute, Changchun, 130012, China

*E-mail: dzwei@mail.neu.edu.cn (Dezhou Wei); liuwengang@mail.neu.edu.cn (Wengang Liu)

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A novel process was developed to markedly increase gold cyanidation performance from an arsenic-containing gold-bearing concentrate. Before cyanidation, a two-step bio-oxidation pretreatment was employed to decrease the arsenic content in the residue and obtain a high cyanidation efficiency for gold. Bio-oxidation results indicated that most of the arsenic was rapidly removed from the mineral into the solution in the first bio-oxidation step, and a high redox potential benefited the bio-oxidation process. With an increase in the redox potential of the solution, the As(III) concentration in the solution was decreased. After the first step of the bio-oxidation process, only 4.38% of the arsenic remained in the residue when the slurry density was 7%. After the second step of the bio-oxidation process, the arsenic content in the residue was decreased to 1.81% when the slurry density for the second step of the bio-oxidation process was 14%. Cyanidation tests indicate that the leaching rate of gold could reach 95.66% after sequential two-step bio-oxidation; this leaching rate was much higher than that of the direct cyanidation and one-step bio-oxidation pretreatment.

Keywords: Redox potential; Bio-oxidation; High arsenic gold concentrate; Cyanidation

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