



Removal of arsenopyrite from complex sulfide minerals by froth flotation

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Arsenic (As) is one of hazardous materials and a penalty element in metal concentrates and so metal concentrates containing arsenic of over 0.5% has been currently restricted in import and export trade. It also corrodes a smelting furnace as well as shortens its life cycle. In Korea, Janggun mine that produces galena (PbS) /sphalerite (ZnS) concentrate containing arsenic of 1.78% charges a penalty of US\$ 2/ton to LS-Nikko smelter. Hence in this work, flotation tests for removal of arsenopyrite (FeAsS) from sulfide mineral concentrates were carried out using lab scale flotation cell, which maintain grade and recovery of PbS and ZnS in comparison to flotation plant. Particularly, this study was focused on investigating the combination of several chemical reagents (depressant, collector, activator and etc.) that affect flotation performance. In the straight differential flotation for PbS, a PbS grade of 75.80% and a recovery of 90.12% could be obtained with FeAsS removal of 84.1% (0.2% As) under the conditions of 20% feed solids concentration, pH 8.5, 50g/t frother (AF65), 40g/t collector (AP242) and 800g/t As depressant (NaHSO₃) and 600g/t Zn depressant (ZnSO₄). In the ZnS flotation, the maximum separation achievable for ZnS using froth flotation has been shown to be a grade of 72.57% and a recovery of 95.43%. At this time, FeAsS removal of 87.8% (0.16% As) could be successfully accomplished under pH 11, and 800g/t Zn activator (CuSO₄), 75g/t frother (AF65), 60g/t collector (AP211) and 600g/t As depressant (NaHSO₃).

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