



ABSTRACT

Extensive deposits of copper-gold ore occur in Saindak areas of Baluchistan, Pakistan. The copper-gold ore of Saindak contains gold in refractory form, locked in sulfide matrix of chalcopyrite and pyrite. Its gold and silver grades are 0.5ppm and 1.5ppm respectively. An experimental investigation was carried out to extract gold from it at laboratory scale. Being a low grade gold ore, it was beneficiated first by froth flotation technique to enrich its gold content. The process variables such as particle size of ore of feed, pH of pulp, pulp density, type and quantity of reagents and conditioning time were optimized to obtain maximum grade and recovery of concentrate. At optimum conditions, a copper-gold concentrate containing 20% Cu with 17ppm Au content was produced. The concentrate obtained contains mainly pyrite and chalcopyrite as gold containing minerals. As sulfide minerals hinder the gold dissolution, therefore flotation concentrate was roasted at 700°C with definite temperature programming to break the sulphide matrix for the liberation of gold particles. Roasted concentrate was subjected to cyanidation process. The various parameters of cyanide leaching i.e. particle size, concentration of cyanide ions, retention time and slurry density under aerated conditions were optimized. Leachant collected was processed by Merrill Crowe process and smelting at 1250°C in SiC crucible. Bullion weighing 1.8gram, having 27% gold and 61% silver was recovered. Head sample of ore, concentrate prepared and roasted material were analyzed by wet methods of analysis i.e. volumetric and gravimetric techniques as well as by different latest instrumental methods like Inductively Coupled Plasma (ICP/OES) System, Scanning Electron Microscope (SEM/EDX), X-Ray Diffractometer (XRD) and X-Ray Fluorescence meter (XRF). 65% gold and 49% of silver were recovered from Saindak copper-gold ore by this method.