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Characteristics of copper matte bioleaching using indigenous acidophilic bacteria for recovering the valuable resources

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This study investigated the efficiency of bioleaching and the surface alteration of copper matte under batch experimental conditions at 32 degrees Celsius using the indigenous acidophilic bacteria collected from acidic hot spring in Hatchnobaru, Japan. In a polarizing microscope analysis, the copper matte made of polished section consists of native copper and chalcocite. The results showed that the pH in the bacteria inoculating sample exhibited lower than in the absent bacteria (control) sample whereas the Eh in the bacteria present case exhibited higher than in the absent case. After 15 days from incubation the leached content of Cu was 1785.7 mg/l as a recovery rate of 30.71% and this content represents 33 times higher than that of the control sample. And the content of Fe, Pb and Zn exhibited 3.5, 3.2 and 1.5 times more than in the absent bacteria sample, respectively. Through the SEM analysis, we found a number of secondary minerals which coated the cupper matte surface at 32 degrees Celsius 12 days after inoculation. The results of XRD analysis revealed that the peaks of chalcocite were observed in the control sample, on the other hand, these peaks were not detected in the copper matte. However, the peaks of covellite was able to perceive in the bioleached copper matte.