

The As removal from arsenopyrite-bearing mine waste by microwave

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Penalties incurred by miners for arsenic in concentrates have increased significantly because the removal and disposal of arsenic is difficult and costly for smelters and because the environmental challenges are increasing worldwide. Typically miners incur penalties on arsenic in concentrates above 0.2% As with smelter rejection limits of 0.5%. Therefore, finding an effective solution for removing As during primary mining activities is necessary to avoid penalty. The aim of this study was to investigate the As removal from mine waste using microwave process. The mine waste samples were characterized by chemical and XRD analysis. To determine of As removal from the microwave experiments, aqua regia digestion was performed according to Korean environmental standard method(KESM) and the As removal effect were evaluated using the standard EPA toxicity characteristic leaching procedure(TCLP, EPA 1311 method). The result of mineralogical character for mine waste using XRD was detected arsenopyrite, pyrite, chalcopyrite, pyrrhotite and quartz. The chemical analysis of As, Pb, Zn contents in the mine waste measured 13,896.0, 896.1 and 1,054.6 mg/kg, respectively. The As removal of experiments was conducted to examine the effects of microwave exposure time(1~15min). The results showed that the As removal in mine waste (exposure time = 10min) was 92.90%, and the temperature of mine waste by microwave heating was 886 [U+2103]. The TCLP leaching of treated mine waste by microwave measured values were below the EPA's current regulatory threshold(As, Pb, Zn : 5 mg/L). The optimum condition of microwave exposure for As removal from arsenopyrite-bearing mine waste was obtained at 800W, 2450MHz, 10min.

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