Enhancement of gold grade through arsenic removal in the gold concentrate using sulfuric acid baking and hot water leaching

Hyun-sung on, Dae-hack lim, Eun-ji myung, Hyun-soo kim, and Cheon-young park

Dept. of Energy and Resources Engineering, Chosun Univ., Gwang-Ju, Korea, Republic Of (onhyunsung@naver.com)

In order to improve gold recovery, in general, the roasting process is carried out on gold concentrate. However in this process, Arsenic(As) is released from the gold concentrate and valuable elements such as Fe, Cu, Zn and Pb are converted into oxides. This causes air pollution through the release of As and loss of valuable elements by discarding the oxide minerals in the tailings. In order to prevent the release of As and the loss of valuable metals, an acid baking experiment was carried out on the gold concentrate with the addition of an H_2SO_4 solution. The baking effect, H_2SO_4 concentration effect and the effects of changing the baking time were examined using an electric furnace. In experimental results, soluble metal sulfates such as Rhomboclase and Mikasite were formed in the baked samples as seen through XRD analysis. In hot(70 degree Celsius) water leaching of the roast and baked samples, As the contents leached were 60 times more in the baked sample than the roast sample, and the Fe, Cu, Zn and Pb contents were 17, 10, 14, 13 times in the baked sample than in the roast sample, respectively. In the water leached solid-residues, the maximum gold grade was upgraded by 33% due to the acid baking effect. It is confirmed that acid baking with H_2SO_4 prevented As release into the air and the recovery of valuable metals through hot water leaching such as Fe, Cu, Zn and Pb which were formerly discarded in the tailings.