

EXTRACTION OF URANIUM AND MOLYBDENUM FROM LOW-GRADE U-MO ORES THROUGH MECHANICAL ACTIVATION FOLLOWING ACID LEACHING OF PAPER

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ABSTRACT

The Guyuan area of Northern China is host to significant uranium-molybdenum (U-Mo) deposits that consist of higher-grade ores at depth and lower-grade ores near the surface. The low-grade surface ores are recovered by strip mining, but currently this material is stockpiled and not utilized due to high processing costs. The stockpiled surface ores amount to over 1 million tonnes, with an average grade of 0.26% Mo and 0.0142% U.

Molybdenum occurs in an amorphous form, and is therefore difficult to concentrate through standard beneficiation techniques. To enrich the ore, we considered pretreatment using mechanical activation, and then extraction of the metals using sulfuric acid. The effects of milling time, oxidant, and optimal leaching conditions were investigated in a laboratory setting. Preliminary results indicate that mechanical activation reduces ore particle size and increases the reaction-surface area of the ore to yield higher metal recovery. When the MnO₂ is added during the milling process,

Mo recovery increases. The effect of mechanical activation on U recovery, however, is not as apparent. Agglomeration occurs during the milling process, which reduces Mo recovery significantly, especially when the milling time is more than 120 minutes. Using this approach, Mo and U recovery can reach 84.52% and 61.39%, respectively, under optimized conditions.