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# The Fundamental Research and Industrial Application on $CO_2+O_2$ in-situ Leaching Process in China

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**Abstract :** Traditional acid in-situ leaching (ISL) is not suitable for the sandstone uranium deposit with low permeability and high content of carbonate minerals, because of the blocking of calcium sulfate precipitates. Another factor influences the uranium acid in-situ leaching is that the pyrite in ore rocks will react with oxidation reagent and produce lots of sulfate ions which may speed up the precipitation process of calcium sulphate and consume lots of oxidation reagent. Due to the advantages such as less chemical reagent consumption and groundwater pollution, $CO_2+O_2$ in-situ leaching method has become one of the important research areas in uranium mining. China is the second country where $CO_2+O_2$ ISL has been adopted in industrial uranium production of the world. It is shown that the $CO_2+O_2$ ISL in China has been successfully developed. The reaction principle, technical process, well field design and drilling engineering, uranium-bearing solution processing, etc. have been fully studied. At current stage, several uranium mines use $CO_2+O_2$ ISL method to extract uranium from the ore-bearing aquifers. The industrial application and development potential of $CO_2+O_2$ ISL method in China are summarized. By using $CO_2+O_2$ neutral leaching technology, the problem of calcium carbonate and calcium sulfate precipitation have been solved during uranium mining. By reasonably regulating the amount of $CO_2$ and $O_2$, related ions and hydro-chemical conditions can be controlled within the limited extent for avoiding the occurrence of calcium sulfate and calcium carbonate precipitation. Based on this premise, the demand of $CO_2+O_2$ uranium leaching has been met to the maximum extent, which not only realizes the effective leaching of uranium, but also avoids the occurrence and precipitation of calcium carbonate and calcium sulfate, realizing the industrial development of the sandstone type uranium deposit.

**Keywords :** $CO_2+O_2$ ISL, industrial production, well field layout, uranium processing
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