

## Uranium recovery from waste ores by an indigenous *Acidithiobacillus ferrooxidans* in laboratory

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The feasibility of bioleaching recovery of uranium from the 721 Uranium Mine Shan-nan deposit waste ores, located in the Jiangxi Province, south of China, were investigated. A mesophilic iron oxidizing bacterium, *Acidithiobacillus ferrooxidans* has been isolated from the uranium mine ores. Bioleaching experiments were carried out in four columns. The effects of bacterial strain, pH, temperature, Eh and initial ferric concentrations on the uranium bacteria column leaching were evaluated.

The results indicate that the efficiency of uranium extraction is dependent on all of the aforementioned variables. In addition, results show that the effects of ore size and temperature had more effect. The maximum uranium recovery was achieved 62% from waste ores which grade is 0.0245%, acid consumption are less than 4%, control the initial acidity concentration is 20g/L and spray amount from 20% to 15% in the acidification stage, initial ferric concentration from 5g/L to 3g/L and leaching solutions pH value less than 2.0 (avoid ferric precipitated) in the bacteria leaching stage, after 84 days. The uranium recovery was over 65% at the ore diameter less than 15mm.

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## China geochemical baselines

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China Geochemical Baselines (CGB) is an Earth science project to provide nation-wide geochemical baselines, spatial distribution and evolution of all elements, and finally to establish a Digital Element Earth in China. The first 5-year term for the CGB project was launched in 2008.

### Goals

The goals of the CGP project are to (1) establish China nationwide geochemical baseline data for rocks and soils, (2) display spatial distribution of nearly all elements in the crust, (3) explore evolution of elements with geologic times from Archeozoic to Quaternary, (3) trace sources of geochemical patterns, and (5) identify areas of interest for natural resources and environments.

### China Geochemical Reference Networks

The CGB Project is designed to divide each Global Reference Networks (GRN) [1] grid into 4 China Geochemical Reference Networks (CGRN) grids. Approximately 1500 CGRN grids cover the whole China mainland (9.6 millions km<sup>2</sup>). Primary (rocks) and secondary (soils) samples are both collected.

### Chemical Analysis

Nearly all natural elements (except gases) in the periodic table are determined by ICP-MS/AES following 4-acid digestion and XRF following fusion as backbone methods combined with other 10 methods. Analytical quality is under strict control by using standard reference samples.

### Geochemical Database

An Internet-based geochemical database will be established for Digital Element Earth, which can provide data and maps through the Internet.

[1] Darnley *et al.* (1995) *Earth Science* **19**, UNESCO Publishing (Paris) 122pp.