

## The responding of carbon isotopic compositions of the organic sediments to environmental change since Holocene in the Bosten Lake, Xinjiang, China

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Bosten lake (86°40'~87°26'E, 41°56'~42°14'N) with a large water area 1002.4 km<sup>2</sup> is located in the northwestern part of China. The lake level is about 1048.75m as the hydrological records in 1955. The lake average depth is 8.2m, the highest depth is 17m. The annual average temperature is 6.3°C, and average rainfall is 68.2mm, annual evaporation is 1800 to 2000mm.

The core BSTC2000 was sampled at 2-cm intervals and the analyzed items include organic matter content (TOC), C/N of organic matter, carbon isotopic compositions and n-alkane of organic sediments. As the results of carbon isotopic compositions of organic sediments, it is shown that carbon isotope of terrestrial plants, floating and submerged plants were lighter below to -26‰. But that of merged aquatic plants were heavier over than -26‰. At the same time, when the lake became depth, merged plants with a heavy carbon isotope bloomed. Otherwise, with the raising of the temperature, the lake became shallow. Terrestrial plants, floating and submerged plants with light carbon isotope bloomed, and merged plants degenerated during this time. From the results of organic matter content (TOC), C/N of organic matter, carbon isotopic compositions and n-alkane of organic sediments, the temperature and lake level raised from 8060aB.P. to 3830aB.P. at the Bosten Lake. During this interval, merged plants bloomed. The paleoclimate condition was warm-wet and cold-dry controlled by the East Asian Monsoon mainly. After 3830aB.P., the palaeoclimatic condition changed greatly. With the rising of temperature, the lake level fall. The paleoclimate was warm-dry and cold-wet controlled by the westerly.

## Catalytic effect of the combination of catalysts on bioleaching of low-grade Chalcopyrite ore

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Chalcopyrite is the most important copper mineral. It is, however, relatively recalcitrant to chemical and bacterial oxidation because of its special crystal structure and electrochemistry in contrast to many other copper minerals. It is essential to find some desirable methods to enhance chalcopyrite bioleaching.

The low-grade chalcopyrite ore used in this study was obtained from Yongping Copper Mine, SE-China. The particle size was less than 5mm. The chemical composition is as follows: 0.40% Cu, 14.12% Fe, 13%S. The chemical phase analysis showed that chalcopyrite is 0.38% and the other copper minerals 0.02%. The mixed *Acidithiobacillus ferrooxidans* and *Acidithiobacillus thiooxidans* used in this study were isolated from acid mine drainage at Yongping Copper Mine. Leaching experiments were carried out in 250 mL elenmeyer flasks with 80ml 9K + S medium without Fe<sup>2+</sup> and 20ml inoculation at initial pH 1.20 (pH values were controlled within 1.50 during the bioleaching) and 25%(W/V) pulp density. The activated carbon, Ag<sup>+</sup> and Fe<sup>2+</sup> concentrations were added as need. The flasks were incubated in a rotary shaker at 130 rpm and 30°C.

The combination of activated carbon, Ag<sup>+</sup> and Fe<sup>2+</sup> can greatly enhance the copper dissolution during the bioleaching of low-grade chalcopyrite ore. The best bioleaching results can be achieved under the combination of 3.0 g/L activated carbon, 2.0 mg/L Ag<sup>+</sup> and 8.0 g/L Fe<sup>2+</sup>, in this case, the bioleaching rate of copper reaches 93.5% after 310 h bioleaching. When the combination of 3.0 g/L activated carbon and 2.0 mg/L Ag<sup>+</sup> is used, the bioleaching rate of copper reaches 84% after 450 h bioleaching. The bioleaching rates of copper is only 79% after 600 h bioleaching when only 3.0 g/L activated carbon is added. It is found that it is more favorable to the bioleaching of copper from low-grade chalcopyrite ore if the low redox potential is controlled at 550 ~ 650 mV.

This study is supported by China International Science and Technology Cooperation Project (2008DFA71760).