Carbon and oxygen isotopic variations in the lowermost Triassic microbiaitic succession in Guizhou, South China

JIANBO LIU[1], LITING JIAN[2] AND YOICHI EZAKI[3]

[1]Department of Geology, Peking University, Beijing 100871, China (jbliu@pku.edu.cn)
[2]School of Earth Sciences and Resources , China University of Geosciences (Beijing) Beijing 100083 , China
[3]Department of Geosciences, Osaka City University, Osaka 558-8585, Japan

Post-extinction microbialites were prolific in the earliest Triassic shallow-marine settings. In South China, the eoveal microbialites are distinctive in lithological textures and structures, consisting of sparitic thrombolitic framework and micritic sediments with primary aragonite composition. Here we present a parallel, carbon/oxygen isotopic study of sparitic and micritic components of themicrobialites at Zheya, southern Guizhou of South China, to decipher the origin of the microbialites and secular changes in oceanic conditions immediately after the end-Permian mass extinction.

The temporal changes in $\delta^{18}O$ values of the thrombolitic framework show a roughly identical trend with that of the micritic ones. $\delta^{18}O$ value of the micritic sediments increases ~3‰ from the uppermost Permian to the basal microbialite and continues the increase of ~2‰ from the upper *parvus* zone to the *isarcica* zone. The oxygen isotope compositions of the microbialites are close to that of estimated lowermost Triassic marine seawater, implying that diagenesis had not obliterated the initial oxygen isotopes of the microbialites.

Both $\delta^{13}C$ in the micritic sediments and thrombolitic framework shows a roughly identical negative shift (~ -4‰) from the uppermost Permian to the lowermost Triassic, and gradually decline to the lowermost value (-0.6‰) in the upper *parvus* zone. After that, $\delta^{13}C$ in the micritic sediments turn to a positvie shift (1‰) in the *isarcica* Biozone. The earliest Triassic $\delta^{13}C$ minimum within the microbialites from Zheya has also been documented from many other Triassic records around the world, representng a probally global negative shift in the oceans. However, micritic sediments in the basal microbialites show a slight depletion in ^{13}C relative to the thrombolitic frameworks, which might be caused by the mineralogical alteration of the thrombolitic framework from original aragonite to calcite. Thence, the identification of variable microbial isotopic shifts in the lowermost Triassic microbialite here is critical to elucidating both global paleoenvironmental changes and origin of microbialites after the end-Permian mass extinction.

Uranium leaching by a pure culture of *Acidobacillus ferrooxidans* in laboratory

JINHUI LIU*, YAJIE LIU, WEIRONG WU, ZHANXUE SUN AND XUEGANG WANG

East China Institute of Technology, School of Civil and Envrionmental Engineering, Fuzhou City, Jiangxi Province, P.R. Chnia, 344000

This study presents an uranium leaching experiment using uranium minerals from Xiangshan volcano type uranium deposit by a pure culture of *Acidobacillus ferrooxidans*. In this deposit, tetravalent uranium is the principal form of uranium, accounting for 90.7% in the total uranium content. It is costly to leach this type of uranium ore for the large ammount of oxidant consuming in convention leaching process. While in bioleaching, ferric iron, produced by iron oxidated bacteria, is more active than the chemical one[1]. Therefore, taking advantage of a self-designed experimentation equipment, four tank leaching tests were set up (A, B, C & D) and mierals were leached by a pure culture of *A.f.*, which was separated, purified and domesticated from Xiangshan uranium minerals, and had a good adaption of uranium leaching liquors and high oxidated capacity of ferrous. After acidified, the revived culture was poured into each tank with aeration at intervals till the end of experiment.

The results showed that at the stage of acidification, the uranium leaching rate was only 28.7% in average. While at the end of bioleaching, the average Leaching rate reached to 85.6% and 88.3% by liquid and slag, respectively. It is obvious that this strain of *A.f.* was very efficient to oxidize U(IV) to U(VI)..

(1) The strain of A.f. has good stability and strong activity in the leaching system; (2) Uranium leaching rate can be increased when bacteria interact with uranium ore; (3) The amount of oxidant will be greatly decreased when this strain of *A.f.* is used in leaching uranium test.

This work was supported by grants from Chinese National 863 Project (2007AA06Z120), Jiangxi Provincial Department of Education Project (GJJ08309) and China International Science and Technology Cooperation Project (2008DFA71760).

[1] Barrie Johnson(2006) *Hydrometallurgy* **83**, 153-166.