## U–Pb zircon, geochemical and isotopic constraints on age and origin of Cretaceous granites from the North Qinling, central China and implications for interaction between crust and mantle

XIAOXIA WANG<sup>1</sup>\*, TAO WANG<sup>2</sup>, QIUJU QI<sup>3</sup> AND SHAN LI<sup>2</sup>

<sup>1</sup>Institute of Mineral and Resource, Chinese Academy of Geological Science, Beijing 100037, China (\*xiaoxiawang@hotmail.com)

<sup>2</sup>Institute of Geology, Chinese Academy of Geological Science, Beijing 100037, China

<sup>3</sup>China University of Geosciences, Beijing 100083, China

Zircon U-Pb dating, geochemical and isotopic (Nd, Sr, Hf) analyses for two granitoid plutons have been carried out in the different blocks of the North Qinling. Zircon dating by LA-ICP-MS for the Lantian granite in the southern margin of the North China Block and Muhuguan granite in the North Qinling orogen yields ages of 133±1 Ma and 150±1Ma, respectively. The samples studied from the Lantian granite contain zircons mostly having xenocrystic cores. The inherited zircons have Paleoproterozic ages. Both granites exhibit similar mineralogical, chemical and isotopic characteristics. They have metaluminous to peraluminous compositions (A/CNK ratios 0.9 to 1.05) and display K<sub>2</sub>O/Na<sub>2</sub>O ratios of 0.9 to 1.5. In terms of trace elements, they show an enrichment of LREE and medium fractionation between LREE and HREE  $(La_N/Yb_N \text{ ratios } 16 \text{ to } 33)$ . Compared with the primordial mantle, distinct negative anomalies of P and Ti, and slight negative anomalies of Ba and Nb are observed in both granite plutons. They are further characterized by low  $\varepsilon_{Nd}(t)$  of -11.8to -18.3 and  $\varepsilon_{\rm Hf}(t)$  of -23.4 to -5.7 for the Liantian granite and low  $\varepsilon_{Nd}(t)$  of -7.6 to -11.4 and  $\varepsilon_{Hf}(t)$  of -17.4 to -7.3 for the Muhuguan granite. We interpret these Cretaceous granites as partial melting of old crust, mixed with juvenile mantle component and suggest the basement of the North Qinling with more juvenile composition from the southern margin of North China block to Shangdan suture.

## Particle size effects in bioleaching of uranium waste ore

WANG XUEGANG<sup>1,2,3\*</sup>, SUN ZHANXUE<sup>3</sup>AND LIU JINHUI<sup>3</sup>

<sup>1</sup>State Key Laboratory Breeding Base of Nuclear Resources and Environment, East China Institute of Technology, Nanchang, JX 330013, P. R. China (\*correspondence:xuegangwang@yahoo.com.cn)

<sup>2</sup>Key Laboratory of Radioactive Geology and Exploration Technology Fundamental Science for National Defense, East China Institute of Technology, Fuzhou, JX 344000, P. R. China

<sup>3</sup>Department of Civil and Environmental Engineering, East China Institute of Technology, Fuzhou, JX 344000, P. R. China (zhxsun@ecit.cn, liujh@ecit.cn)

The effect of mineral paricle size on the bioleaching of uranium from the 721 Uranium Mine Shan-nan deposit waste ore, located in the Jiangxi Province, south of China, was investigated. A mixed bacteria, which isolated from the uranium mine ores and the predominant bacteria were *Acidithiobacillus ferrooxidans* and *Leptospirillium ferriphilum*, was applied into the column bioleaching test. The uranium leaching effect in different particle size uranium ore were shown in table 1.

| particle size<br>(mm) | U content<br>(%) | Slag U content<br>(%) | Leaching<br>rate(%) |
|-----------------------|------------------|-----------------------|---------------------|
| >25                   | 0.0289           | 0.00258               | 10.73               |
| 20-25                 | 0.0141           | 0.00098               | 30.49               |
| 15-20                 | 0.0161           | 0.00089               | 44.72               |
| 10-15                 | 0.0330           | 0.00093               | 71.81               |
| 5-10                  | 0.0332           | 0.00069               | 79.21               |
| 2-5                   | 0.0403           | 0.00068               | 83.13               |
| 1-2                   | 0.0434           | 0.00058               | 86.63               |
| <1                    | 0.0479           | 0.00057               | 88.10               |

**Table 1**: The leaching rate of different particle size

As can be seen from table 1, with the waste uranium ore particle size decreasing, the leaching rate was increasing. Decreasing the particle size from 25mm to 1mm the uranium leaching rate enhanced from 10.73% to 88.1%. While the particle size less than 15mm fraction leaching rate was over 71.81\%, also the particle size greater than 15mm fraction leaching rate less than 44.72%, which adverse to uranium bioleaching. Consider the actual process, recommended crushed ore to -15mm can be obtained better effect.

Project supported by the National High-tech R&D Program of China (863 Program) (No.2007AA06Z120) and International Cooperation Projects of China (No. 2008DFA71760).

Mineralogical Magazine

www.minersoc.org