

Effect of phosphate fertilizer on the mobility of arsenic in fairdpur soil, central Bangladesh

X.B. GAO¹, Y.X. WANG^{1*}, Q.H. HU² AND T. MA¹

¹School of Environmental Studies and MOE Laboratory of Biogeology and Environmental Geology, China University of Geosciences, Wuhan, 430074 P. R. China
(Xubo.gao.cug@gmail.com; *correspondence: YX.Wang@cug.edu.cn; Tengma@cug.edu.cn)

²Department of Earth and Environmental Science, The University of Texas at Arlington, Arlington, TX 76010
(maxhu@uta.edu)

Effects of long term using of phosphate fertilizer on the mobilization of arsenic from soils have been seldom studied. In this study, the effects were investigated by column experiments using surface soil samples collected from fairdpur, central Bangladesh, an area with high arsenic presence in groundwater. A solution of 160 mg/L Ca(NO₃)₂ was first applied to the fully-saturate columns packed with soils to establish the stable As concentration in the effluent, and followed by leaching with phosphate fertilizer solution (represented with 10 mg/L Na₂HPO₄). An increase in the arsenic concentration in the effluent was observed after the Ca(NO₃)₂ input solution was replaced with either Na₂HPO₄ solutions. Dissolution of soluble arsenic-bearing minerals in the sediment with a rapid release of As, major cations, Fe, Mn, and Si was observed in the first hour. During the leaching period, there is no significant increase of As(III)/As(V) ratios in the effluent due to the oxic conditions in the experiment. Desorption of As from oxyhydroxide sorbents by phosphate is one of the major factors responsible for the elevated As concentration observed in the effluent [1, 2]. During the leaching periods of Na₂HPO₄, sodium mole percentage, as well as Na⁺/Ca²⁺ and Na⁺/Mg²⁺ ratios, of the effluent increased, probably due to aggregate breakdown, colloidal dispersion and mobilization in the columns, while an increase in Fe and Mn contents of the effluent may result from the release of particulate Fe and Mn oxyhydroxides. In addition, complexation of particulate arsenic with Fe/Mn oxyhydroxides may account for a significant portion of the enhanced arsenic concentration in the effluent.

[1] Gao et al. (2011) *Journal of Environmental Science & Health, Part A* **46**, 471-479. [2] Wang et al. (2009) *Applied Geochemistry* **24**, 641-649.

LA-ICP-MS zircon U-Pb geochronology of granites and its geological implication in the Baiganhu W-Sn deposit, NW China

YONG-BAO GAO^{1,2*}, WEN-YUAN LI¹ AND ZHAO-WEI ZHANG^{1,2}

¹Xi'an Center of Geological Survey, CGS, Xi'an, Shaanxi 710054, China

²Chang'an University, Xi'an, Shaanxi 710054, China
(*correspondence: gaoyongbao2006@126.com)

Baiganhu W-Sn deposit is a new found large W-Sn deposit in Qimantge, NW China, and W-Sn mineralization is closely related to the tonalite and monzonite granite, both of which belong to S-type granites. However, because of lacking of precise isotopic dating, the metallogenic epoch of Baiganhu W-Sn deposit is disputed. This paper provides the LA-ICP-MS zircon U-Pb isotopic dating result of the tonalite (BKN-01) and monzonite granite (BKN-03) from the Baiganhu deposit and discusses its geological significance. The CL images of zircons in the granites show most of the zircons present the typical characteristics of magmatic zircons with zoning structures. The LA-ICP-MS Zircon U-Pb isotopic dating show that the weighted mean ²⁰⁶Pb/²³⁸U ages of tonalite and monzonite granite are 429.5±3.2 Ma (MSWD = 0.0026), and 430.5±1.2 Ma (MSWD = 0.0111) respectively. Both of the ages are concordant (Fig.1), and they can represent the petrogenic ages of the granites. Therefore, this paper proposed that the S-type granites in Caledonian period, which were formed by the melting of sedimentary strata, are closely related with forming of W-Sn in Baiganhu deposit. These findings are of great significance in further research on the formation environment of Baiganhu W-Sn deposit, and guiding the ore prospecting directions.

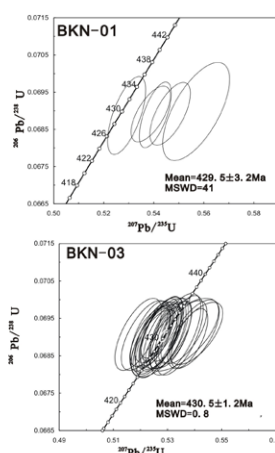


Figure 1: U-Pb concordia diagram of zircons of granites in the Baiganhu W-Sn deposit, Qimantage, NW China.

This study was supported by China Geological Survey project (No. 1212010911032, 1212011121088 and 1212011121092)