

Ten micron zircon dating using LA-Q-ICPMS

H.L. YUAN^{1,2*}, K.Y. CHEN¹, G.F. HE¹,
J.Y. SONG¹ AND S. GAO^{2,1}

¹State key laboratory of continental dynamics, Department of Geology, Northwest University, Xi'an 710069, China
(*correspondence: hlyuan@263.net)

²State Key Laboratory of Geological Processes and Mineral Resources, Faculty of Earth Sciences, China University of Geosciences, 430074, China

Small volumetric zircon dating is important for zircons with complex rings and small zircons < 12 micron [1, 2]. We developed a high-spatial-resolution method for *in situ* zircon U-Pb dating using LA-Q-ICPMS, and evaluated the accuracy of the method by analyzing six zircon standards (91500, GJ-1, BR266, Temora-2, Mud Tank, and SK10-2). The method employs a spot size of 10 µm and a laser frequency of 4 Hz. The single-point relative deviation (2σ) of ²⁰⁶Pb/²³⁸U zircon ages obtained for the five international standards is less than 2.8%, and the relative standard deviation (2RSD) of the weighted-average ²⁰⁶Pb/²³⁸U ages is less than 0.7%. The relative deviation (2σ) of a single-point ²⁰⁶Pb/²³⁸U age for the internal laboratory standard zircon SK10-2 is 1.9%–6.8%, while the relative standard deviations (2RSD) of weighted-average ²⁰⁶Pb/²³⁸U ages are less than 2%, which is higher than that for other standard zircons because of the young age of this zircon and relatively low radiogenic Pb content (7.0 µg g⁻¹). The weighted-average ²⁰⁶Pb/²³⁸U ages of the analyzed standard zircons are in good agreement with reference values with 2σ error. The proposed method is therefore considered to be valid for zircons with U-Pb concentrations above the limit of instrumental detection (*i.e.* ²⁰⁶Pb, ²⁰⁷Pb, and ²³⁸U contents exceeding 0.1, 0.1, and 0.02 µg g⁻¹, respectively). This method is expected to be useful in studies that seek to determine the U-Pb ages of different zones within individual zircons, as commonly observed in detrital and metamorphic zircons.

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[1] Johnston *et al.* (2009) *Chem. Geol.* **259**, 218–229. [2] Zong *et al.* (2010) *Chem. Geol.* **269**, 237–251.

Researches on bioavailability of hazardous metals in rhizosphere and bulk soils of an alluvial plain area

YUAN XUYIN^{1,2}, LI JIZHOU^{1,2} AND LI YUNFENG²

¹Key Laboratory Of Integrated Regulation And Resource Development On Shallow Lakes, Ministry of Education, Nanjing 210098, China (yxy_hjy@hhu.edu.cn)

²College of Environmental Science and Engineering, Hohai University, Nanjing 210098 China

Samples of rhizosphere and bulk soils were collected at 144 sites of Changjiang River Delta Region. The concentrations of TOC, pH, and speciation of As, Hg, Cd, Cr, Pb were determined. We figured out the correlation between the exchangeable metals and TOC, pH and compared the two typical soils. Statistical results show TOC in rhizosphere soil is higher than that in bulk soil (2.05%:1.87%), but the pH value is lower in rhizosphere soil (6.84:7.00). The exchangeable metals in rhizosphere soil have pronounced higher concentrations among five hazardous metals. Cadmium shows the highest proportion and Cr reveals the lowest part for the exchangeable fraction.

Significant diversities of exchangeable proportion for rhizosphere and bulk soils present in Pb and Hg. But no significant diversities present in As and Cr. In most cases, the correlation between toxic metals and TOC in rhizosphere soil is better than that in bulk soil. But pH and metals shows the uncertainly correlation between two kinds of soils. The exchangeable Hg displays a best association with TOC and the exchangeable Cd is following. The exchangeable Cd and Pb show the good correlation with pH values. The microbe and humic acid in soils makes an obvious effect on the metal speciation, which is distinctive for metals in this area. They show the large action to Cd and Hg and the less action to As and Cr. But the root acids in rhizosphere soils promote absorbable metals. On the other hand, the proportion of exchangeable Pb fluctuates largely, follows by Cd, which indicates the atmospheric deposition. Therefore, obvious changes of bioavailability of toxic metals can be affected distinctively by microbe and humic acid, even atmospheric input.