Thallium isotope fractionation in the soil-plant interface

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Thallium is highly accumulated in green cabbage, and its isotope fractionations ($\varepsilon^{205/203}$Tl) in the soil-green cabbage interface were determined for the first time by the technique of MC-ICP MS. The Tl-polluted soil and green cabbage (root, stem and leaf) samples were digested using closed-vessel microwave techniques. A two-stage anionic exchange chromatographic procedure (BioRad AG1 X 8 200-400 mesh) was applied to separate Tl from the matrix prior to isotope composition measurements. The $\varepsilon^{205/203}$Tl values of samples were on-line corrected on a cycle-by-cycle basis for mass discrimination using the exponential law relative to the ^{208}Pb/^{206}Pb ratio of admixed SRM 981 Pb. The thallium isotope analysis results showed that thallium yielded obvious isotopic fractionations in the soil-plant interface. The $\varepsilon^{205/203}$Tl in the root soil was +0.5, but greatly negative to –2.51 in the root, -3.05 in the stem and –5.13 in the leaf of green cabbage. The $\varepsilon^{205/203}$Tl values negatively correlated to thallium concentrations in the green cabbage tissues, implying that the enrichment of ^{205}Tl in the green cabbage corresponded to higher concentrations of total thallium and the speciation of Tl^+. This study revealed valuable information on thallium biogeochemical cycling for the first time, which may also help understand better the geochemical processes of activation, mobility and enrichment of thallium in the surface environment.

Huanglong group limestone geochemical constraints on the formation of bauxite in Xinmin, northwest Guizhou Province, China

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Xinmin, Guizhou bauxite deposit which is located in Yangzi block NNE syncline to the east wing of Longqiao is a medium-large sized sedimentary deposit on the surface of limestone erosion. Permian Liangshan Formation is the main aluminum-containing rocks. Ore body grew up in the 5000m, tend to extend 800m, the average thickness of 2.25m, Al_2O_3 content of 66.91%, A / S is 6.21. Studies suggest that Carboniferous Huanglong group is mainly composed of light gray - off-white microcrystalline - aplitic limestone of middle-thick bedded. Limestone base play an important role in Ore-forming geochemistry environmental and metallogenic provenance. karst swale topography of limestone In sedimentation basin provide an advantaged terrain, the limestone Karst depressions of sedimentary basin formed for the ore-bearing sedimentary rocks provide favorable terrain conditions

The thickness of aluminum-containing rock formation with the ups and downs of karst surface for a change; in the process of limestone, alkali earth metal like Mg, Ga and others flow with water in the form of bicarbonate ($CaCO_3+H_2O+CO_2 \rightarrow Ca(HCO_3)_2$), soluble chloride ($CaCl_2$) and sulfate ($CaSO_4$), and finally change into other residues like poorly soluble aluminum silicates, iron hydroxide and titanium oxides so on. Some minerals frome the limestone of Huanglong Group. The geochemical environment of alkali basement provided by Huanglong formation limestone is conducive to the aggregation of Al, Fe and Ti and bauxite deposit

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