

Zircon and whole-rock Hf isotope constraints on the petrogenesis of Transhimalayan plutonic rocks

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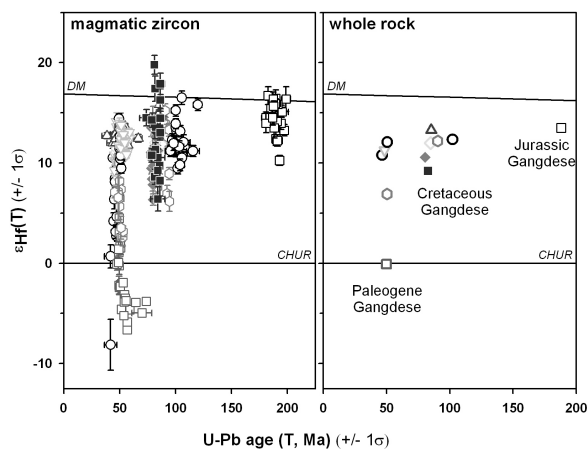
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Hf isotopes of whole-rock (WR) samples and their zircon separates can be used in much the same way as Nd isotopes. Moreover, *in situ* zircon Hf isotopes, combining U-Pb ages, often record "hidden" information that allows more detailed studies of the petrogenetic processes. This study reports Hf isotope data from principal Transhimalayan intrusions, which include Jurassic, Cretaceous and Paleogene I-type Gangdese batholiths, resulting from Neotethyan subduction prior to the India-Asia collision. Major conclusions are reached: (1) There are significant variations in Hf isotopes of magmatic zircons, up to ~15 ϵ -units in some samples, suggesting magma mixing and/or magma-source isotopic heterogeneity to be common features; (2) A "hidden" DM (depleted mantle) component, with $\epsilon_{\text{Hf}}(\text{T}\sim 80\text{Ma})$ values to +19.8, is identified in the Gangdese magmatic zircons. This DM-type component has never been revealed by any WR isotope analysis (WR- $\epsilon_{\text{Hf}}(\text{T})$: -0.1 to +13.5); (3) According to the linear correlation between the Gangdese WR Hf and Nd isotope ratios, this DM endmember has an equivalent $\epsilon_{\text{Nd}}(\text{T}\sim 80\text{Ma})$ value of ca. +8 and thus shows an affinity to the India rather than Pacific DM source involved in the petrogenesis.

Figure 1. Hf isotopes of zircons and host rocks from the Gangdese batholiths, southern Tibet.



Particularities of Mn²⁺ uptake by living and dead *Shewanella putrefaciens*

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Sorption to microbial cell walls influences the fate and cycling of metals in the environment. Sorption of Mn²⁺ by living and dead *Shewanella putrefaciens* (widely spread in the environment gram-negative reducing bacterium) was studied in batch conditions: pH effect, kinetics of adsorption, equilibrium isotherms, the effect of the bacteria doses on adsorption, and speciation of dissolved forms in the experimental solutions.

Although FR-IR spectra of live and autoclaved cells of the facultative anaerobic bacterium *S. putrefaciens* do not reveal differences in cell wall functional groups, sorption of Mn²⁺ by suspensions of living and dead cells deviate significantly from one another. Sorption to dead cells is characterized by rapid equilibration and the data can be described by an isotherm. In contrast, sorption to live bacteria exhibits complex time-dependent kinetics, which cannot be captured by a single isotherm. Although the live bacteria release proteins and carbohydrates to solution, electrochemical analyses do not indicate strong aqueous complexation by organic ligands. FT-IR spectra of the (initially) live bacterial suspensions show evidence for the presence of MnO₂ after 24 days, implying the occurrence of manganese oxidation. Mn²⁺ oxidation by living *S. putrefaciens* is a temperature dependent process.