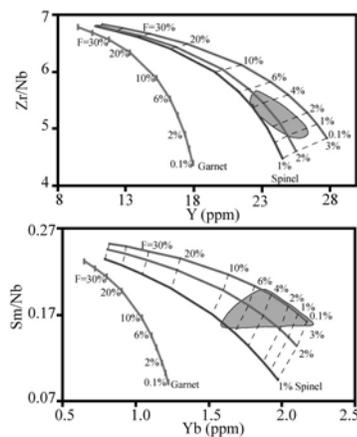


Magma source of Karamay Cambrian pillow basalt, West Junggar (Xinjiang, NW China)

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Ophiolite melanges [1-4], and related magmatic rocks [5-9] occurring in north Xinjiang are important for understanding the tectonics of Central Asia [10-12]. Pillow basalts adjacent to the Karamay ophiolite belt, with OIB-type features, was formed in Cambrian period [13], which is at least 50Ma earlier than the Karamay ophiolite. The Karamay lherzolite was referred to represent the primary mantle rock consisting of olivine, clinopyroxene, orthopyroxene, and spinel. By choosing the partition coefficients for basalt, changing the mineral composition in source region and the initial melting ratios to match both the petrology and chemical features. In the plots of Zr/Nb versus Y and Sm/Nb versus Yb, all samples plot in the partial melting area of spinel lherzolite, which suggests that the pillow basalts were produced by low-degree partial melting (<10%) of spinel lherzolite. The REE behaviours of the studied pillow basalts [13] also support this conclusion.



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Stardust comet samples and the relationship to chondrites

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Introduction

It is increasingly clear that mineral assemblages of particles from comet 81P/Wild 2 collected by Stardust are most similar to those of chondrites [1-3]. Our goals are to explore petrographic similarities between Wild 2 samples and chondrite groups, and the relationships between comets and chondrite parent bodies.

Discussion

Wild 2 samples are dominated by high temperature, reduced mineral assemblages. These assemblages are typical of chondrites, with olivine, pyroxene, FeNi-metal and sulfide. Forsterite is dominant. Olivine and low-Ca pyroxene range in mg# (Fa_{0.5-41} and Fs₀₋₄₈, respectively), indicating the material is unequilibrated. Some forsterite with <1 wt% FeO has up to 6.4% MnO (LIME) and 1.4% Cr₂O₃ [1]. Other silicates include diopside, melilite, spinel typical of CAIs in chondrites. Osbornite (TiN), is found in some particles, including a CAI with anorthite, spinel, Al-diopside [4].

The range of compositions, occurrence of Mn-rich forsterite, metal and pentlandite in the comet particles are features similar to those of CR, CH, and CM chondrites. Mn-rich forsterite occurs in AOAs in CRs [5]. Aside from Wild 2, osbornite and osbornite-bearing CAIs are known only in the CH and the Isheyevu CH/CB chondrites [6-8].

Comet Wild 2 particles have mineral assemblages that link them to the CR and CH chondrites, both members of the CR chondrite clan [9]. CR clan as well as other C chondrites [e.g., 10] may be derived from cometary parent bodies or asteroids that evolved from comets.

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