

Geochemistry of Platinum-group elements in the Kalatongke Cu-Ni sulfide deposit, Xinjiang, China

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We have analyzed 55 samples from the Kalatongke deposit for the concentrations of S, Ni, Cu and platinum-group elements (PGE) and the results are reported here. The concentrations of PGE in the sulfide mineralized samples generally increase with sulfide contents, suggesting that PGE distribution in the deposit is mainly controlled by sulfides. The concentrations of total PGE in massive, heavily-disseminated and weakly-disseminated sulfide ores are 287, 196 and 55 ppm. The average concentrations of total PGE in norite, gabbro, gabbro and diorite are 15, 12, 9 and 2 ppb, respectively.

Sulfide-bearing and sulfide-poor samples have similar mantle-normalized PGE patterns. They all have fractionated patterns characterized by depletion of Ir, Ru and Rh, and enrichment of Pt, Pd and Au. These features, together with high Cu/Ni ratios of the sulfide ores, are consistent with a highly-evolved parental magma that may have derived from a tholeiitic basalt. The Cu/Pd ratios of norite, gabbro and diorite vary from 173000 to 65710, respectively. These values are significantly higher than the typical mantle value of 6500 given by Barnes and Maier [1], suggesting previous sulfide segregation at depth. The Pd/Ir ratios of samples containing weakly-disseminated sulfides are rather restricted, mostly between 10 and 30. The Pd/Ir ratios of heavily-disseminated and massive sulfides are highly variable, ranging from 2 to 550, respectively. Significant variations of Pd/Ir ratios in these ores are consistent with fractional crystallization of monosulfide solid solution (mss) from a sulfide liquid. Ir is compatible whereas Pd is incompatible in mss [2]. Lower Pd/Ir ratios indicate higher proportions of cumulus mss in the samples.

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[1] Barnes & Maier (1999) *Geological Association of Canada Short Course Notes* **13**, 69-106. [2] Li C *et al.* (1996) *Geochim. Cosmochim. Acta* **60**, 1231-1238.

Chromium nucleosynthetic anomalies in bulk and components of chondrites

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The use of short-lived radiometric systems as high-resolution chronometers for early Solar System events relies on the assumption that the Solar System has homogeneous isotopic compositions for the daughter elements and for the abundance of the parent isotopes. A recent study shows apparent correlation between ^{54}Cr and ^{53}Cr excess in bulk carbonaceous chondrites [1]. The variation in the former is often attributed to a nucleosynthetic origin, while that in the latter is usually assumed to reflect decay of ^{53}Mn . Thus it is not clear why the two should be correlated and whether or not ^{53}Cr variability partially reflects a nucleosynthetic origin. These are important questions especially because the ^{53}Mn - ^{53}Cr extinct nuclide system has become an increasingly useful and widely applied cosmochronometer. Identifying the ^{54}Cr carrier phase will assist in addressing the relationship, if any, of ^{54}Cr and ^{53}Cr variability.

To address these issues, we report here Cr isotope analyses of leachates at various temperatures of acid residues of carbonaceous, ordinary and enstatite chondrites. We also address the issue of Cr nucleosynthetic anomalies in bulk carbonaceous chondrites where incomplete dissolution of refractory presolar grains can be a problem.

The leachates of acid residues of Murchison (CM) show large excess in $\epsilon^{54}\text{Cr}$. The excess increases from 36 to 77 ϵ when the leach temperature increases from 60 to 80°C, but remains constant when the temperature increases to 90°C. The leachates of carbonaceous chondrites from various subgroups show similar excesses (70 to 200 ϵ) at 80°C, indicating a common Cr-anomaly carrier. In contrast, the leachates of enstatite chondrites show very small or no anomaly in ^{54}Cr . Our preliminary results for two flux-fused bulk carbonaceous chondrites show excesses in ^{54}Cr of $\sim 1 \epsilon$, consistent with previous work [2]. However, neither of them show resolvable deviation from the terrestrial standard in ^{53}Cr .

[1] Shukolyukov & Lugmair (2006) *Earth Planet. Sci. Lett.* **250**, 200-213. [2] Trinquier *et al.* (2007) *Astrophys. J.* **655**, 1179-1185.