

## Magnesium isotopic composition of A-type granites from NW India-Asia collision zone, Xinjiang, China

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Recent studies have significantly increased our knowledge on Mg isotopic compositions of chondrite, the terrestrial mantle and hydrosphere. Behaviours of Mg isotopes during magmatic evolution, however, is still not well constrained. Though very limited isotope fractionation has been reported during basaltic magmatism [1], it is still unclear whether Mg isotopes can be fractionated during granite differentiation. Understanding behaviours of Mg isotopes in granites will not only shed light on Mg isotopic composition of the continental crust and global Mg isotope recycling, but also provide constrains on its petrogenesis.

Here, we reported high-precision Mg isotopic data for a set of whole-rock samples and biotite minerals from A-type Kuzigan granitoids, Xinjiang, China. The Kuzigan complex is located at the middle-east Pamir syntax and distributed along the Karakorum fault. They are LREE-enriched peralkalic syenites and syenitoids with potassium feldspar, plagioclase, biotite and aegirine-augite as their common minerals. The chemical compositions of Kuzigan complex vary widely in SiO<sub>2</sub> (54.2 to 74.8%) and MgO (0.45 to 5.50%), and enriched in K<sub>2</sub>O (K<sub>2</sub>O/Na<sub>2</sub>O>1). This complex was considered to be produced by partial melting of mafic eclogite at the base of the thickened crust during regional extension at 11Ma.

Despite the large variations in SiO<sub>2</sub> and MgO contents, Mg isotopic compositions show a very limited range at both whole-rock and mineral scales. Similar to those of terrestrial basalts, peridotites and associated olivine and pyroxenes,  $\delta^{26}\text{Mg}$  values vary from -0.39 to -0.26 for bulk granites and from -0.33 to -0.19 for biotites. The homogenous Mg isotopic composition thus suggests no significant Mg isotope fractionation occurred during magmatic differentiation within our analytical uncertainties. Consequently, our observations suggest that the thickened eclogitic lower crust has similar Mg isotopic composition to upper mantle and basalts and Mg isotopic compositions of granitoids can sample their source rocks.

[1] Teng *et al.* (2007) Earth Planet. Sci. Lett. **261**, 84–92.

## PGE in mantle nodules from the Newer Volcanics, Victoria: Sulfide control during mantle melting

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Platinum group element (PGE) concentrations have been measured by nickel sulfide fire assay – ICPMS in a suite of 24 ultramafic nodules from volatile-rich alkaline basalts in the Newer Volcanic Province in western Victoria, Australia. Mineralogy and chemical composition of the nodules identifies them as a suite of variably melted mantle lithosphere samples ranging from highly depleted harzburgites with ~30% melt extraction to nearly unmelted ‘fertile’ lherzolites, from which a MORB-like melt had been extracted at depths of 40 to 45 km. This melting event produced a series of linear geochemical trends on plots of Ca, Al, Ni and Ca against MgO. Copper correlates strongly with Se, which is taken as a proxy for S, and both elements correlate strongly with Ca, implying that a sulfide component was progressively lost to the partial melt with increasing degrees of melting. However, there is no correlation of Pt and Pd (PPGE) with Se and Ca, and PPGE remain relatively constant at around 3-6 ppb each. This implies that the PGE content of the restites remained essentially constant during melting, up to the point of the most depleted harzburgite sample. This suggests that the PPGEs were retained in an ‘all or nothing’ manner by residual sulfide in the restite. Iridium contents show a wide and unsystematic scatter from 0.5 to 4.5 ppb, and no relationship to degree of melt extraction, implying residence of Ir in micro-nugget inclusions within silicates, although these have not been located. The petrography of the less depleted samples is complicated by the presence of veinlets of glass, interpreted as the result of flash partial melting during ascent. Element mapping using the Maia detector on the Australian Synchrotron X-ray fluorescence beamline indicates that most of the sulfides in the least depleted samples are localised as droplets within these melt veinlets, and that rare PGE minerals are associated with the sulfides. However, the volume of veinlets is far too low to account for the observed Ca-Se spread, and it appears that they have only remobilised the low-melting intergranular component on the scale of the samples. A metasomatic origin for the sulfide-PPGE component is precluded by lack of correlation with LREE enrichment.