Trace elements in garnets of diamondiferous xenoliths from the Nurbinskaya pipe, Yakutia

Z. V. SPETSIUS[1], W.L. GRIFFIN[2], S.Y. O'REILLY[2,] AND V.I. BANZERUCK[1]

[1]YaNIGP CNIGRI, ALROSA Co. Ltd., Mirny, Yakutia, 678170, Russia, (spetsius@cnigri.alrosa-mir.ru)
[2]GEMOC ARC National Key Centre, Macquarie University, NSW 2109, Australia, (wgriffin@els.mq.edu.au)

Rare earth elements (REE) and other trace elements were analyzed by LAM-ICPMS in garnets of about 150 mafic and ultramafic diamondiferous xenoliths from the Nurbinskaya pipe. Most garnets are homogeneous in terms of major- and trace-element contents. Garnets from ultramafic xenoliths define two groups, one with sinusoidal REE_N (chondrite normalised) patterns (10 harzburgites, two lherzolites) and one with flat $MREE_N$ (lherzolites, some websterites).

Most eclogitic garnets have LREE-depleted patterns (Ce_N as low as 0.1), and no Eu anomalies. Heavy rare earth elements are variably enriched; most Lu_N varies 20-50. Most websteritic garnets show REE patterns similar to this but they are typically enriched in LREE with Ce_N (0.2-0.5). Garnets with nearly flat HREE and small positive Eu anomalies are common in coesite-bearing eclogites and those containing kyanite and/or corundum [1]. Another group of garnets (n=9) from eclogites and websterites have small negative Eu anomalies. These types of pattern commonly are interpreted as evidence of the reaction of plagioclase to garnet and used to support the origin of mantle eclogites by subduction of oceanic crust [1, 2], but may be simply a redox feature. Garnets from highly aluminous eclogites show convex REE patterns enrichment in LREE and strong depletion of in HREE (Yb_N<5). Garnets of corundum-bearing eclogites commonly have positive slopes within the $LREE_N$, peaking at Sm and then slowly decreasing to about chondritic abundance for Lu. LAM-ICPMS analysis could be used to show how different populations within an eclogite xenolith series can document the heterogeneous evolution of the lithospheric mantle beneath cratonic areas.

References

[1] Spetsius Z.V. (2004) *Lithos* **48**, 525–538.
[2] Jacob D. E., Foley S. F. (1999) *Lithos* **48**, 317–336.