

Table DR3. Plagioclase rare earth elements (REE) data																											
Sample ID	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Ba	Th	Nb	Y	Hf	Ta	U	Pb	Rb	Cs	Sr	Sc	Zr
NSH MS99033-1	1.36	2.38	0.27	1.07	0.19	0.39	0.18	0.03	0.16	0.03	0.08	0.01	0.07	0.01	57	0.01	0.06	0.95	0.01	0.00	0.00	0.37	1.7	0.10	512	0.3	1
NSH MS99033-2	1.48	2.60	0.31	1.17	0.23	0.37	0.21	0.03	0.19	0.03	0.09	0.01	0.07	0.01	56	0.01	0.07	1.18	0.02	0.00	0.01	0.50	2.3	0.13	500	0.3	1
NSH MS99033-3	1.46	2.59	0.30	1.18	0.24	0.37	0.23	0.04	0.22	0.05	0.12	0.02	0.10	0.01	61	0.01	0.04	1.49	0.02	0.00	0.02	1.28	3.8	0.29	493	0.4	1
NSH MS99033-4	1.46	2.52	0.29	1.19	0.21	0.38	0.21	0.03	0.17	0.03	0.09	0.01	0.07	0.01	58	0.01	0.04	1.09	0.02	0.00	0.01	0.42	2.8	0.20	506	0.3	1

* This ICPMS REE analysis is done by the GeoAnalytical Lab at Washington State University. Four plagioclase crystals with minimal visible other mineral inclusions from anorthosite sample MS99033 were picked for REE analyses. The units of all analyses are in parts per million (ppm).

* The Flux used for the fusion is di-Lithium-tetraborate (Spectromelt® A-10, EM Science, Gibbstown, NJ). Reagents are HNO3 69-70% (Fisher ACS plus grade), HF 48-52% (Baker ACS reagent grade), HClO4 67-71% (Fisher Trace Metal Grade), and H2O2 (Baker ACS Reagent). The HF is further purified before use by sub-boiling distillation in a teflon still. All water used is >18 M deionized water from a Nanopure analytical grade water system (Barnstead/Thermolyne)

Powdered samples are mixed with an equal amount of lithium tetraborate flux (typically 2g), placed in a carbon crucible and fused at 1000° C in a muffle furnace for 30 minutes. After cooling, the resultant fusion bead is briefly ground in a carbon-steel ring mill and a 250 mg portion is weighed into a 30 ml, screw-top Teflon PFA vial for dissolution. The acid dissolution consists of a first evaporation with HNO3 (2ml), HF (6 ml), and HClO4 (2 ml) at 110° C. After evaporating to dryness, the sample is wetted and the sides of the vial are rinsed with a small amount of water before a second evaporation with HClO4 (2 ml) at 160° C. After the second evaporation, samples are brought into solution by adding approximately 10 ml of water, 3 ml HNO3, 5 drops H2O2, 2 drops of HF and warmed on a hot plate until a clear solution is obtained. The sample is then transferred to a clean 60 ml HDPE bottle diluted up to a final weight of 60g with de-ionized water.

Solutions are analyzed on an Agilent model 4500 ICP-MS and are diluted an additional 10X at the time of analysis using Agilent’s Integrated Sample Introduction System (ISIS). This yields a final dilution factor of 1:4800 relative to the amount of sample fused. Instrumental drift is corrected using Ru, In, and Re as internal standards. Internal standardization for the REEs uses a linear interpolation between In and Re after Doherty (1989) to compensate for mass-dependant differences in the rate and degree of instrumental drift. Isobaric interference of light rare earth oxides on the mid- heavy REEs can be a significant source of error in ICP-MS analysis, so tuning is optimized to keep the CeO/Ce ratio below 0.5%. Correction factors used to compensate for the remaining oxide interferences are estimated using two mixed-element solutions. The first contains Ba, Pr, and Nd, and the second Tb, Sm, Eu, and Gd. Standardization is accomplished by processing duplicates of three in-house rock standards interspersed within each batch of 18 unknowns. Concentrations, oxide- and drift corrections are then calculated offline using a spreadsheet. Methods description is provided by: <https://environment.wsu.edu/facilities/geoanalytical-lab/technical-notes/icp-ms-method/>.