Supplementary Information for

# Molybdenum systematics of subducted crust record reactive fluid flow from underlying slab serpentine dehydration

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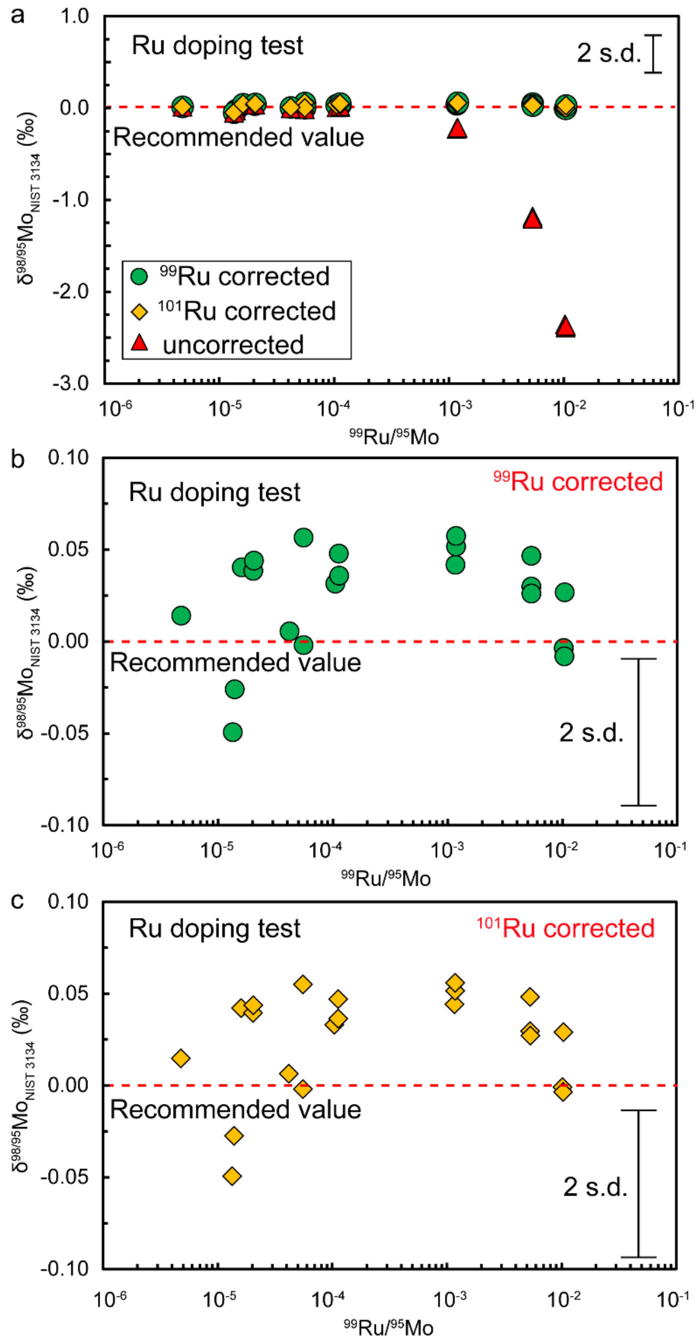
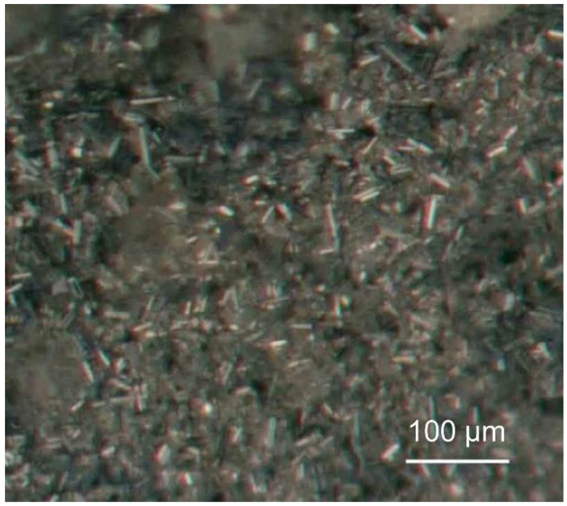
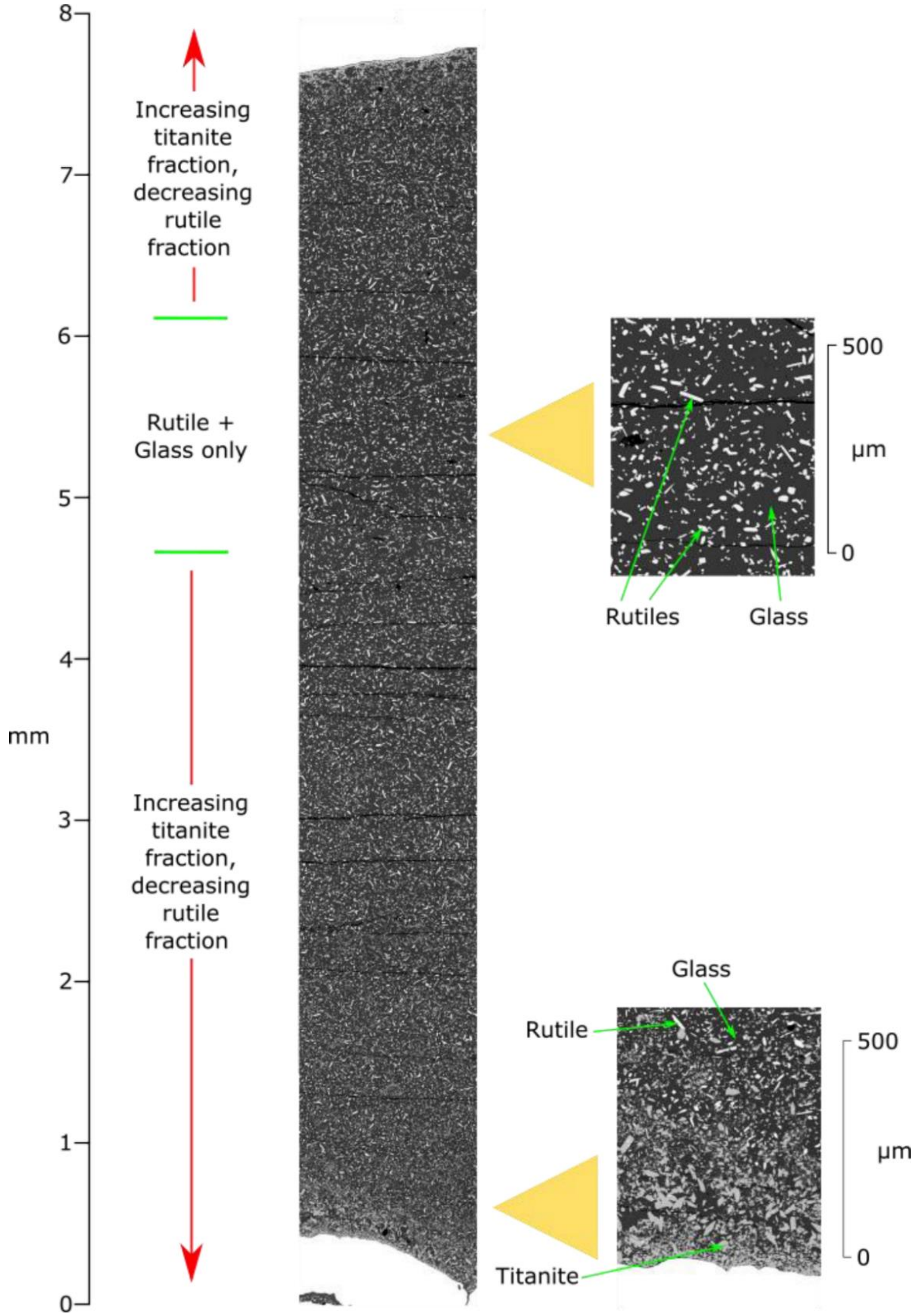
## Supplementary Figures




**Supplementary Figure 1.** Ruthenium (Ru) doping test for correction of Mo isotope data. NIST SRM 3134 was doped with different concentrations of Ru. The $^{98}$Ru and $^{100}$Ru interferences have been corrected using $^{99}$Ru or $^{101}$Ru as monitors. The effects of Ru interferences are illustrated in (a) together with close ups of corrected $\delta^{98/95}Mo_{NIST\ 3134}$ values using $^{99}$Ru (b) or $^{101}$Ru (c).




**Supplementary Figure 2.** Photomicrograph of undissolved residue of quenched experimental charge after 1 M HF dissolution at room temperature. Rutiles can be recognised by their lath shape.




**Supplementary Figure 3.** Composite of back-scattered images representing the total length of the capsule. Inset images represent the titanite-free, two-phase zone of the sample as well as the titanite-richest, three-phase zone in the coldest end of the capsule.

## Supplementary Tables

### Supplementary Table 1. Major and trace elemental and isotopic data compilation of high-pressure mafic and ultra-mafic samples from Raspas Complex and Cabo Ortegal Complex.

| **Location** | **Ecuador (Raspas Complex)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sample | SEC15-2 | SEC16-1 | SEC42-6 | SEC43-1 | SEC43-3 | SEC44-1 | SEC46-1 | SEC46-2 | SEC47-1 |
| Rock type | Blueschist | Blueschist | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite |
| $SiO_2$ | 47.79 | 47.31 | 45.61 | 47.92 | 50.17 | 48.67 | 44.08 | 44.88 | 47.49 |
| $Al_2O_3$ | 14.80 | 18.15 | 14.54 | 14.67 | 13.89 | 14.84 | 14.71 | 13.49 | 15.07 |
| $TiO_2$ | 1.95 | 2.39 | 2.26 | 1.79 | 1.86 | 1.91 | 1.87 | 2.00 | 1.94 |
| $Fe_2O_3$ | 10.65 | 10.18 | 15.14 | 13.04 | 13.30 | 13.75 | 15.48 | 13.77 | 13.87 |
| MnO | 0.20 | 0.16 | 0.28 | 0.19 | 0.23 | 0.19 | 0.24 | 0.21 | 0.23 |
| MgO | 7.00 | 4.44 | 6.16 | 6.46 | 6.65 | 6.00 | 10.09 | 8.72 | 6.01 |
| CaO | 10.50 | 8.36 | 11.84 | 11.10 | 10.67 | 10.84 | 10.87 | 13.41 | 11.15 |
| $Na_2O$ | 3.04 | 3.29 | 3.26 | 3.09 | 3.02 | 3.02 | 1.69 | 2.30 | 2.77 |
| $K_2O$ | 0.27 | 1.59 | 0.15 | 0.53 | 0.07 | 0.48 | 0.16 | 0.11 | 0.51 |
| $P_2O_5$ | 0.31 | 0.54 | 0.20 | 0.13 | 0.17 | 0.16 | 0.11 | 0.74 | 0.17 |
| LOI | 3.72 | 2.64 | 0.27 | 0.57 | 0.42 | 0.00 | 0.45 | 0.00 | 0.37 |
| Total | 100.23 | 99.05 | 99.71 | 99.49 | 100.45 | 99.86 | 99.75 | 99.63 | 99.58 |
| Li | 19.40 | 62.50 | 35.20 | 48.50 | 13.80 | 51.40 | 11.00 | 13.30 | 67.30 |
| Sc | 29.00 | 35.60 | 46.00 | 44.30 | 42.60 | 43.20 | 44.80 | 48.00 | 42.90 |
| V | 209.00 | 254.00 | 415.00 | 376.00 | 390.00 | 389.00 | 362.00 | 431.00 | 358.00 |
| Cr | 265.00 | 24.00 | 187.00 | 214.00 | 111.00 | 211.00 | 253.00 | 252.00 | 256.00 |
| Co | 37.20 | 31.50 | 50.20 | 45.70 | 40.10 | 45.00 | 51.90 | 37.90 | 45.40 |
| Ni | 146.00 | 112.00 | 80.00 | 77.50 | 53.00 | 75.90 | 71.20 | 59.10 | 74.20 |
| Cu | 48.20 | 46.90 | 78.50 | 92.60 | 35.30 | 52.80 | 79.00 | 137.00 | 69.30 |
| Zn | 77.80 | 113.00 | 136.00 | 229.00 | 106.00 | 218.00 | 280.00 | 277.00 | 143.00 |
| Ga | 16.30 | 25.20 | 18.70 | 19.20 | 18.20 | 18.40 | 13.10 | 10.90 | 19.00 |
| Rb | 2.21 | 28.20 | 4.38 | 15.30 | 1.06 | 13.10 | 0.53 | 0.42 | 12.70 |
| Sr | 269.00 | 329.00 | 76.70 | 92.50 | 77.00 | 66.80 | 31.60 | 36.80 | 103.00 |
| Ba | 47.93 | 1466.00 | 77.80 | 98.80 | 21.20 | 79.40 | 6.76 | 21.10 | 60.90 |
| Ti | 11700 | 14340 | 13560 | 10740 | 11160 | 11460 | 11220 | 12000 | 11640 |
| Y | 31.90 | 39.30 | 52.60 | 43.10 | 46.10 | 45.10 | 49.10 | 46.40 | 48.00 |
| Zr | 165.00 | 240.00 | 131.00 | 116.00 | 109.00 | 110.00 | 102.00 | 104.00 | 109.00 |
| Nb | 14.80 | 29.20 | 3.64 | 2.04 | 2.40 | 2.03 | 2.19 | 4.26 | 2.09 |
| Hf | 3.82 | 5.23 | 3.68 | 3.01 | 2.85 | 2.89 | 2.86 | 2.91 | 3.13 |
| Ta | 0.93 | 1.73 | 0.24 | 0.13 | 0.14 | 0.13 | 0.14 | 0.18 | 0.15 |
| Pb | 1.28 | 2.44 | 2.97 | 3.81 | 1.50 | 4.06 | 0.65 | 0.57 | 2.90 |
| Th | 1.06 | 2.12 | 0.42 | 0.21 | 0.21 | 0.15 | 0.13 | 0.17 | 0.14 |
| U | 0.33 | 0.46 | 0.33 | 0.21 | 0.07 | 0.18 | 0.18 | 0.54 | 0.19 |
| La | 13.70 | 24.20 | 5.73 | 4.09 | 3.75 | 3.70 | 4.08 | 4.40 | 3.71 |
| Ce | 36.30 | 54.10 | 16.10 | 11.80 | 12.70 | 11.60 | 13.60 | 14.10 | 11.70 |
| Pr | 4.49 | 7.45 | 2.90 | 2.14 | 2.28 | 2.17 | 2.53 | 2.46 | 2.18 |
| Nd | 19.80 | 31.20 | 15.50 | 11.50 | 12.60 | 11.90 | 13.90 | 12.90 | 12.40 |
| Sm | 5.07 | 7.35 | 5.36 | 4.03 | 4.38 | 4.23 | 5.11 | 4.28 | 4.54 |
| Eu | 1.79 | 2.38 | 1.82 | 1.43 | 1.57 | 1.57 | 1.71 | 1.51 | 1.57 |
| Gd | 5.51 | 7.68 | 6.94 | 5.47 | 5.90 | 5.70 | 6.74 | 5.60 | 6.12 |
| Tb | 0.88 | 1.21 | 1.31 | 1.00 | 1.08 | 1.07 | 1.18 | 1.00 | 1.17 |
| Dy | 5.43 | 7.31 | 8.84 | 6.95 | 7.33 | 7.35 | 7.89 | 6.96 | 7.92 |
| Ho | 1.08 | 1.43 | 1.89 | 1.49 | 1.58 | 1.56 | 1.66 | 1.55 | 1.69 |
| Er | 2.94 | 3.93 | 5.40 | 4.26 | 4.59 | 4.48 | 4.74 | 4.52 | 4.83 |
| Tm | 0.43 | 0.57 | 0.80 | 0.63 | 0.69 | 0.67 | 0.71 | 0.68 | 0.71 |
| Yb | 2.80 | 3.76 | 5.36 | 4.16 | 4.60 | 4.49 | 4.83 | 4.54 | 4.80 |
| Lu | 0.41 | 0.55 | 0.79 | 0.60 | 0.67 | 0.65 | 0.72 | 0.68 | 0.71 |
| $^{87}Sr/^{86}Sr$ | | 0.704668 | 0.706562 | 0.706091 | 0.703781 | 0.706034 | 0.705275 | | 0.705102 |
| 2SE | | 0.000005 | 0.000004 | 0.000005 | 0.000005 | 0.000005 | 0.000005 | | 0.000004 |
| $^{143}Nd/^{144}Nd$ | | 0.512870 | 0.513072 | 0.513174 | 0.513214 | 0.513182 | 0.513213 | | 0.513189 |
| 2SE | | 0.000003 | 0.000002 | 0.000002 | 0.000003 | 0.000003 | 0.000002 | | 0.000003 |

**Supplementary Table 1 (Continued).**

| **Location** | **Ecuador (Raspas Complex)** | | | **Cabo Ortegal (Spain)** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | SEC50-1 | SEC26-3 | SEC35-2 | SCO1-1 | SCO2-1 | SCO9-2 | SCO12-4 | SCO16-1 | SCO18-1 | SCO23-1 |
| Rock type | Retrogressed eclogite | Serpentinitized peridotite | Serpentinitized peridotite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite | MORB-type eclogite |
| $SiO_2$ | 49.57 | 40.24 | 40.49 | 48.72 | 52.33 | 48.42 | 49.62 | 49.22 | 50.21 | 48.45 |
| $Al_2O_3$ | 13.62 | 1.62 | 2.37 | 15.73 | 14.15 | 15.22 | 14.27 | 15.04 | 12.72 | 15.97 |
| $TiO_2$ | 1.88 | 0.04 | 0.05 | 1.24 | 1.48 | 1.19 | 1.50 | 1.26 | 2.44 | 1.15 |
| $Fe_2O_3$ | 13.30 | 9.86 | 8.02 | 11.61 | 11.99 | 11.82 | 12.77 | 12.94 | 16.94 | 11.27 |
| MnO | 0.19 | 0.14 | 0.12 | 0.19 | 0.19 | 0.20 | 0.18 | 0.21 | 0.22 | 0.18 |
| MgO | 6.72 | 37.85 | 37.26 | 8.34 | 6.90 | 7.84 | 7.81 | 8.25 | 7.29 | 8.04 |
| CaO | 10.48 | 1.47 | 2.48 | 12.15 | 10.35 | 12.83 | 12.20 | 11.96 | 8.24 | 13.31 |
| $Na_2O$ | 3.04 | 0.04 | 0.07 | 1.55 | 3.00 | 2.08 | 1.97 | 1.97 | 2.39 | 2.02 |
| $K_2O$ | 0.07 | 0.01 | 0.01 | 0.04 | 0.17 | 0.02 | 0.01 | 0.06 | 0.09 | 0.04 |
| $P_2O_5$ | 0.17 | 0.02 | 0.01 | 0.12 | 0.17 | 0.08 | 0.12 | 0.08 | 0.21 | 0.09 |
| LOI | 0.81 | 8.81 | 10.01 | 0.39 | 0.00 | 0.63 | 0.00 | 0.00 | 0.00 | 0.41 |
| Total | 99.85 | 100.10 | 100.89 | 100.08 | 100.73 | 100.33 | 100.45 | 100.99 | 100.75 | 100.93 |
| Li | 20.30 | 0.84 | 0.99 | 2.02 | 5.12 | 2.72 | 1.56 | 3.15 | 3.68 | 1.88 |
| Sc | 39.60 | 11.60 | 16.80 | 40.10 | 39.20 | 42.00 | 42.70 | 45.70 | 44.90 | 43.10 |
| V | 329.00 | 67.20 | 73.60 | 274.00 | 290.00 | 290.00 | 322.00 | 421.00 | 452.00 | 392.00 |
| Cr | 144.00 | 2758.00 | 2674.00 | 3.00 | 300.00 | 183.00 | 268.00 | 220.00 | 246.00 | 98.00 |
| Co | 38.40 | 126.00 | 104.00 | 44.40 | 39.40 | 47.60 | 44.10 | 48.50 | 46.90 | 41.80 |
| Ni | 47.00 | 2276.00 | 1957.00 | 3.00 | 64.00 | 62.00 | 71.00 | 70.00 | 78.00 | 40.00 |
| Cu | 32.90 | 16.20 | 4.82 | 57.00 | 70.60 | 109.20 | 24.50 | 18.80 | 88.60 | 45.50 |
| Zn | 57.40 | 53.00 | 50.30 | 64.60 | 86.70 | 82.80 | 50.10 | 74.90 | 123.60 | 70.50 |
| Ga | 16.30 | 1.52 | 2.10 | 14.10 | 16.30 | 15.80 | 16.60 | 17.20 | 19.10 | 18.00 |
| Rb | 0.54 | 0.03 | 0.22 | 1.02 | 2.17 | 0.04 | 0.43 | 1.30 | n.d. | 0.59 |
| Sr | 84.90 | 2.28 | 3.53 | 91.40 | 71.10 | 145.00 | 72.90 | 70.10 | 65.50 | 132.00 |
| Ba | 121.00 | 4.33 | 4.87 | 5.86 | 62.60 | 3.05 | 2.06 | 5.11 | 5.47 | 4.93 |
| Ti | 11280 | 240 | 300 | 7440 | 8880 | 7140 | 9000 | 7560 | 14640 | 6900 |
| Y | 50.50 | 0.78 | 1.58 | 29.90 | 32.70 | 27.80 | 35.80 | 34.30 | 53.40 | 28.70 |
| Zr | 119.00 | 0.16 | 9.49 | 65.30 | 73.70 | 57.90 | 66.20 | 49.80 | 153.00 | 46.10 |
| Nb | 1.91 | 0.01 | 0.01 | 2.68 | 5.27 | 0.96 | 1.78 | 0.96 | 3.70 | 1.48 |
| Hf | 3.25 | 0.01 | 0.24 | 1.79 | 2.11 | 1.68 | 1.98 | 1.56 | 4.01 | 1.40 |
| Ta | 0.14 | 0.00 | 0.00 | 0.16 | 0.33 | 0.06 | 0.11 | 0.06 | 0.25 | 0.09 |
| Pb | 0.74 | 0.28 | 0.28 | 0.34 | 0.70 | 0.71 | 0.28 | 0.67 | 0.37 | 0.70 |
| Th | 0.14 | 0.00 | 0.00 | 0.21 | 1.07 | 0.07 | 0.13 | 0.08 | 0.22 | 0.10 |
| U | 0.05 | 0.01 | 0.00 | 0.08 | 0.71 | 0.06 | 0.04 | 0.02 | 0.48 | 0.06 |
| La | 3.72 | 0.03 | 0.00 | 3.34 | 6.79 | 1.90 | 2.64 | 2.04 | 4.99 | 2.16 |
| Ce | 12.40 | 0.03 | 0.01 | 9.33 | 16.40 | 6.27 | 8.56 | 6.25 | 15.80 | 7.07 |
| Pr | 2.32 | 0.01 | 0.01 | 1.57 | 2.43 | 1.19 | 1.57 | 1.30 | 2.75 | 1.30 |
| Nd | 12.70 | 0.05 | 0.07 | 8.43 | 12.00 | 6.94 | 8.91 | 7.51 | 15.20 | 7.37 |
| Sm | 4.62 | 0.03 | 0.07 | 2.91 | 3.82 | 2.64 | 3.38 | 2.83 | 5.32 | 2.79 |
| Eu | 1.59 | 0.01 | 0.03 | 1.03 | 1.28 | 1.00 | 1.23 | 1.03 | 1.87 | 1.07 |
| Gd | 6.34 | 0.07 | 0.15 | 3.90 | 4.59 | 3.62 | 4.55 | 3.93 | 7.20 | 3.82 |
| Tb | 1.17 | 0.02 | 0.03 | 0.72 | 0.79 | 0.69 | 0.86 | 0.77 | 1.35 | 0.73 |
| Dy | 8.01 | 0.12 | 0.27 | 4.83 | 5.45 | 4.70 | 5.87 | 5.43 | 9.05 | 4.88 |
| Ho | 1.71 | 0.03 | 0.06 | 1.06 | 1.21 | 1.03 | 1.28 | 1.19 | 1.93 | 1.02 |
| Er | 4.89 | 0.09 | 0.19 | 2.97 | 3.45 | 2.91 | 3.67 | 3.42 | 5.41 | 2.92 |
| Tm | 0.73 | 0.02 | 0.03 | 0.44 | 0.52 | 0.44 | 0.54 | 0.50 | 0.81 | 0.43 |
| Yb | 4.89 | 0.12 | 0.20 | 2.91 | 3.47 | 2.92 | 3.61 | 3.31 | 5.43 | 2.85 |
| Lu | 0.73 | 0.02 | 0.03 | 0.43 | 0.51 | 0.43 | 0.52 | 0.50 | 0.80 | 0.42 |

Data soureces: Raspas Complex: Petrology and major, trace elements are from Ref.[1], and Sr-Nd isotopes are from Ref.[2]; Cabo Ortegal Complex: Major, trace elements are from Ref.[3].

**Supplementary Table 2. Compositions of melt, rutile and titanite in the experimental run product.**

| | **Melt** | **Rutile** | **Titanite** |
|---|---|---|---|
| $SiO_2$ | 53.3 (0.4) | 0.2 (0.2) | 30.1 (0.4) |
| $Al_2O_3$ | 19.4 (0.2) | 1.3 (0.1) | 1.9 (0.2) |
| CaO | 6.9 (0.2) | 0.26 (0.03) | 28.8 (0.3) |
| $TiO_2$ | 5.8 (0.2) | 94.7 (0.4) | 38.6 (1.0) |
| $Na_2O$ | 3.9 (0.4) | 0.01 (0.07) | 0.04 (0.05) |
| $K_2O$ | 7.5 (0.2) | 0.19 (0.03) | 0.13 (0.03) |
| $H_2O$* | 4.4 (0.4) | n.a. | n.a. |
| Mo | 472 (51) | 360 (29) | 364 (177) |
| $\delta^{98/95}Mo_{NIST\ 3134}$ (‰) | 0.02 (0.05) | -0.28(0.01) | |
| $\delta^{98/95}Mo_{NIST\ 3134}$ (‰) | 0.04(0.01) | -0.32(0.01) | |

* Water contents calculated by difference to 100%. All oxides in weight percent, Mo in µg/g. Note that Ti was calibrated on an ilmenite crystal, probably causing the poor total for rutile. Mo isotope compositions are given for both digestions of glass as well as rutile. Values in brackets are standard deviations, n.a. = not appropriate.

**Supplementary Table 3. $\delta^{98/95}Mo_{NIST\ 3134}$ and Mo concentration of repeated digestions of W-2a (n = 13), JB-2 (n = 5), and AGV-2 (n = 5) in this study. Each digestion was measured several times.**

| Sample | $\delta^{98/95}Mo_{NIST\ -3134}$ (‰) | 2SD | [Mo] (μg $g^{-1}$) | n | Digestion method | Sample | $\delta^{98/95}Mo_{NIST\ -3134}$ (‰) | 2SD | [Mo] (μg $g^{-1}$) | n | Digestion method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| W-2a (01) | -0.02 | 0.03 | 0.40 | 3 | Bomb | JB-2(1) | 0.04 | 0.02 | 0.87 | 2 | Hotplate |
| W-2a (01) | -0.01 | 0.04 | 0.40 | 3 | Bomb | JB-2(2) | 0.00 | 0.03 | 1.05 | 2 | Hotplate |
| W-2a (02) | -0.07 | 0.03 | 0.40 | 3 | Bomb | JB-2(3) | 0.03 | 0.01 | 0.94 | 2 | Hotplate |
| W-2a (02) | -0.02 | 0.00 | 0.40 | 2 | Bomb | JB-2(3) | 0.05 | 0.06 | 0.93 | 3 | Hotplate |
| W-2a (03) | -0.01 | 0.02 | 0.44 | 3 | Bomb | JB-2(4) | 0.04 | 0.01 | 1.05 | 2 | Hotplate |
| W-2a (04) | -0.04 | 0.08 | 0.43 | 3 | Bomb | JB-2(5) | 0.03 | 0.03 | 0.91 | 3 | Hotplate |
| W-2a (04) | -0.03 | 0.09 | 0.43 | 3 | Bomb | Mean | 0.03 | | 0.96 | | |
| W-2a (05) | -0.05 | 0.01 | 0.42 | 3 | Bomb | 2SD | 0.03 | | 0.15 | | |
| W-2a (05) | -0.06 | | 0.42 | 1 | Bomb | AGV-2(1) | -0.17 | 0.1 | 1.91 | 2 | Bomb |
| W-2a (06) | -0.06 | 0.03 | 0.43 | 3 | Bomb | AGV-2(2) | -0.16 | 0.06 | 1.90 | 2 | Hotplate |
| W-2a (07) | -0.03 | 0.09 | 0.40 | 3 | Hotplate | AGV-2(3) | -0.15 | | 1.85 | 1 | Bomb |
| W-2a (07) | -0.02 | 0.01 | 0.4 | 3 | Hotplate | AGV-2(3) | -0.15 | 0.06 | 1.84 | 2 | Bomb |
| W-2a (08) | -0.02 | 0.05 | 0.41 | 2 | Hotplate | AGV-2 (3) | -0.13 | 0.05 | 1.84 | 3 | Bomb |
| W-2a (09) | -0.01 | 0.05 | 0.40 | 3 | Hotplate | AGV-2(4) | -0.20 | | 1.89 | 1 | Bomb |
| W-2a (09) | 0.00 | 0.09 | 0.40 | 3 | Bomb | AGV-2(4) | -0.16 | 0.02 | 1.89 | 2 | Bomb |
| W-2 (10) | -0.02 | 0.05 | 0.43 | 3 | Bomb | AGV-2(4) | -0.18 | 0.03 | 1.89 | 3 | Bomb |
| W-2 (10) | -0.03 | 0.03 | 0.43 | 3 | Bomb | AGV-2(5) | -0.14 | 0.05 | 1.87 | 3 | Hotplate |
| W-2a (11) | -0.02 | 0.05 | 0.41 | 3 | Bomb | Mean | -0.16 | | 1.88 | | |
| W-2a (11) | -0.02 | 0.02 | 0.41 | 3 | Bomb | 2SD | 0.04 | | 0.05 | | |
| W-2a (11) | -0.02 | 0.04 | 0.41 | 3 | Bomb | | | | | | |
| W-2a (11) | -0.05 | 0.01 | 0.41 | 3 | Bomb | | | | | | |
| W-2a (11) | -0.03 | 0.03 | 0.41 | 3 | Bomb | | | | | | |
| W-2a (11) | -0.01 | 0.03 | 0.41 | 3 | Bomb | | | | | | |
| W-2a (12) | -0.04 | 0.03 | 0.39 | 3 | Bomb | | | | | | |
| W-2a (12) | -0.05 | 0.02 | 0.39 | 3 | Bomb | | | | | | |
| W-2a (13) | -0.07 | 0.05 | 0.42 | 3 | Bomb | | | | | | |
| W-2a (13) | -0.05 | 0.02 | 0.42 | 3 | Bomb | | | | | | |
| Mean | -0.03 | | 0.41 | | | | | | | | |
| 2SD. | 0.04 | | 0.03 | | | | | | | | |

Hotplate refers to samples digested by hotplate. Bomb refers to samples digested by high pressure bomb.

**Supplementary Table 4. Mineral/fluid partition coefficients of Mo and Ce at 2.6 GPa, 600 °C and parameters used for calculating residual eclogite compositions in Fig. 2.**

| **Mineral/fluid partition coefficients** | **Mo**§ | **Ce**ǂ |
|---|---|---|
| $D^{clinopyroxene/fluid}$ | $[40/10^{(0.44\times \log fO2+0.42\times \log NaCl-1.8\times 1000/T+4.8)}]\times\varphi_{600°C}$ | 2 |
| $D^{garnet/fluid}$ | $[12/10^{(0.44\times \log fO2+0.42\times \log NaCl-1.8\times 1000/T+4.8)}]\times\varphi_{600°C}$ | 0.4 |
| $D^{rutile/fluid}$ | $[87670/10^{(0.44\times \log fO2+0.42\times \log NaCl-1.8\times 1000/T+4.8)}]\times\varphi_{600°C}$ | 2 |
| Mineral assemblage | Cpx (68.9%) + Grt (29.6%)+Rt (1.5%) | |
| Parameters used in the models. | Depleted MORB (Average) | Ref. |
| $\delta^{98/95}Mo_{NIST\ 3134}$ (‰) | -0.21 | 4 |
| Mo (μg $g^{-1}$) | 0.19 | 4 |
| Ce (μg $g^{-1}$) | 5.6 | 4 |

§ Mineral/fluid partition coefficients of Mo was calculated at 600 °C based on ref.[5], where $\varphi_{600°C}$ denotes correcting factor of temperature dependence of Zr in rutile (ref.[6]) from 1000 °C to 600 °C, e.g., $\varphi_{600°C}$=[Zr-in-rutile$_{600°C}$]/[Zr-in-rutile$_{1000°C}$]=0.023; ǂ Mineral/fluid partition coefficients of Ce are from ref.[5] and references therein.

## Supplementary References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