|  |
| --- |
| **Table S3.** *Parameters used in quantitative modelling and results (shown in figure 9a, b)* |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | Partition coefficients\* | Composition |
|  | Cpx | Garnet | Amphibole | Rutile | LCCa | Slabb |
| La | *0.082* | *0.005* | *0.089* | *0.0057* | 8 | 3.834 |
| Sr | *0.101* | *0.005* | *0.358* | *0.036* | 348 | 136.05 |
| Y | *0.949* | *9.532* | *3.156* | *0.0118* | 16 | 29.13 |
| Yb | *0.973* | *11.697* | *3.786* | *0.0126* | 1.5 | 3.033 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Eclogite |  | Sr | Y | Sr/Y |
| Cpx | 50% | *0.10* | *0.95* |  |
| Garnet | 50% | *0.01* | *9.53* |  |
|  | Bulk D | *0.05* | *5.24* |  |
|  | LCC | 348 | 16 | 21.8 |
| Batch melting | 5% | 3467.9 | 3.2 | 1089.9 |
| 10% | 2356.1 | 3.3 | 709.3 |
| 15% | 1784.2 | 3.5 | 513.4 |
| 20% | 1435.6 | 3.6 | 394.1 |
| 40% | 805.9 | 4.5 | 178.5 |
|  |  |  |  |  |
| Fractional melting | 5% | 2625.9 | 3.2 | 825.1 |
| 10% | 999.3 | 3.3 | 300.6 |
| 15% | 359.9 | 3.5 | 103.3 |
| 20% | 121.8 | 3.7 | 33.3 |
| 40% | 0.7 | 4.6 | - |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Eclogite |  | Sr | Y | Sr/Y |
| Cpx | 45% | *0.10* | *0.95* |  |
| Garnet | 45% | *0.01* | *9.53* |  |
| Rutile | 10% | *0.04* | *0.01* |  |
|  | Bulk D | *0.05* | *4.72* |  |
|  | LCC | 348 | 16 | 21.8 |
| Batch melting | 5% | 3524.6 | 3.5 | 998.3 |
| 10% | 2380.8 | 3.7 | 646.7 |
| 15% | 1797.5 | 3.8 | 467.3 |
| 20% | 1443.7 | 4.0 | 358.6 |
| 40% | 807.8 | 5.0 | 163.1 |
|  |  |  |  |  |
| Fractional melting | 5% | 2627.2 | 3.5 | 744.0 |
| 10% | 966.6 | 3.7 | 262.3 |
| 15% | 335.9 | 3.9 | 87.1 |
| 20% | 109.5 | 4.0 | 27.1 |
| 40% | 0.5 | 5.1 | - |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Eclogite |  | Sr | Y | Sr/Y |
| Cpx | 50% | *0.10* | *0.95* |  |
| Garnet | 50% | *0.01* | *9.53* |  |
|  | Bulk D | *0.05* | *5.24* |  |
|  | Slab | 136.1 | 29.1 | 4.7 |
| Batch melting | 5% | 1355.8 | 5.8 | 234.0 |
| 10% | 921.1 | 6.0 | 152.3 |
| 15% | 697.5 | 6.3 | 110.3 |
| 20% | 561.3 | 6.6 | 84.6 |
| 40% | 315.1 | 8.2 | 38.3 |
|  |  |  |  |  |
| Fractional melting | 5% | 1026.6 | 5.8 | 177.2 |
| 10% | 390.7 | 6.1 | 64.5 |
| 15% | 140.7 | 6.3 | 22.2 |
| 20% | 47.6 | 6.7 | 7.2 |
| 40% | 0.3 | 8.4 | - |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Eclogite |  | Sr | Y | Sr/Y |
| Cpx | 45% | *0.10* | *0.95* |  |
| Garnet | 45% | *0.01* | *9.53* |  |
| Rutile | 10% | *0.04* | *0.01* |  |
|  | Bulk D | *0.05* | *4.72* |  |
|  | Slab | 136.1 | 29.1 | 4.7 |
| Batch melting | 5% | 1377.9 | 6.4 | 214.4 |
| 10% | 930.8 | 6.7 | 138.9 |
| 15% | 702.7 | 7.0 | 100.4 |
| 20% | 564.4 | 7.3 | 77.0 |
| 40% | 315.8 | 9.0 | 35.0 |
|  |  |  |  |  |
| Fractional melting | 5% | 1027.1 | 6.4 | 159.8 |
| 10% | 377.9 | 6.7 | 56.3 |
| 15% | 131.3 | 7.0 | 18.7 |
| 20% | 42.8 | 7.4 | 5.8 |
| 40% | 0.2 | 9.2 | - |

|  |  |  |
| --- | --- | --- |
|  |  | Partition coefficients# |
|  | PAG 2\*\* | Amphibole | Garnet |
| La | 3.8 | *0.17* | *0.01* |
| Sr | 348 | *0.12* | *0.0011* |
| Y | 17.1 | *1.47c* | *3.1d* |
| Yb | 1.74 | *0.59* | *4.03* |
| Sr/Y | 20.35 | - | - |
| La/Yb | 2.18 | - | - |

|  |  |  |  |
| --- | --- | --- | --- |
| Fractionating assemblage (X) | Sr | Y | Sr/Y |
| Amphibole | 50% | *0.12* | *1.47* |  |
| Garnet | 50% | *0.0011* | *3.1* |  |
|  | Bulk D | *0.06055* | *2.285* |  |
| Degree of fractionation | 0% | 348 | 17.1 | 20.35 |
| 10% | 384.21 | 14.93 | 25.73 |
| 20% | 429.16 | 12.84 | 33.43 |
| 30% | 486.52 | 10.81 | 44.99 |
| 40% | 562.33 | 8.87 | 63.40 |
| 50% | 667.39 | 7.02 | 95.11 |
| 60% | 823.05 | 5.27 | 156.24 |

|  |  |  |  |
| --- | --- | --- | --- |
| Fractionating assemblage (Y) | Sr | Y | Sr/Y |
| Amphibole | 80% | *0.12* | *1.47* |  |
| Garnet | 20% | *0.0011* | *3.1* |  |
|  | Bulk D | *0.09622* | *1.796* |  |
| Degree of fractionation | 0% | 348 | 17.1 | 20.35 |
| 10% | 382.77 | 15.72 | 24.34 |
| 20% | 425.76 | 14.32 | 29.74 |
| 30% | 480.37 | 12.87 | 37.31 |
| 40% | 552.18 | 11.39 | 48.49 |
| 50% | 651.09 | 9.85 | 66.11 |
| 60% | 796.58 | 8.25 | 96.60 |

|  |  |  |  |
| --- | --- | --- | --- |
| Fractionating assemblage (Z) | Sr | Y | Sr/Y |
| Amphibole | 20% | *0.12* | *1.47* |  |
| Garnet | 80% | *0.0011* | *3.1* |  |
|  | Bulk D | *0.02488* | *2.774* |  |
| Degree of fractionation | 0% | 348 | 17.1 | 20.35 |
| 10% | 385.65 | 14.18 | 27.19 |
| 20% | 432.59 | 11.51 | 37.58 |
| 30% | 492.75 | 9.08 | 54.25 |
| 40% | 572.68 | 6.91 | 82.88 |
| 50% | 684.10 | 5.00 | 136.82 |
| 60% | 850.39 | 3.37 | 252.68 |

|  |  |  |  |
| --- | --- | --- | --- |
| Fractionating assemblage (X) | (La)N | (Yb)N | (La/Yb)N |
| Amphibole | 50% | *0.17* | *0.59* |  |
| Garnet | 50% | *0.01* | *4.03* |  |
|  | Bulk D | *0.09* | *2.31* |  |
| Degree of fractionation | 0% | 16.03 | 10.24 | 1.57 |
| 10% | 17.65 | 8.92 | 1.98 |
| 20% | 19.64 | 7.64 | 2.57 |
| 30% | 22.18 | 6.41 | 3.46 |
| 40% | 25.52 | 5.24 | 4.87 |
| 50% | 30.13 | 4.13 | 7.30 |
| 60% | 36.91 | 3.08 | 11.98 |

|  |  |  |  |
| --- | --- | --- | --- |
| Fractionating assemblage (Y) | (La)N | (Yb)N | (La/Yb)N |
| Amphibole | 80% | *0.17* | *0.59* |  |
| Garnet | 20% | *0.01* | *4.03* |  |
|  | Bulk D | *0.138* | *1.278* |  |
| Degree of fractionation | 0% | 16.03 | 10.24 | 1.57 |
| 10% | 17.56 | 9.94 | 1.77 |
| 20% | 19.43 | 9.62 | 2.02 |
| 30% | 21.81 | 9.27 | 2.35 |
| 40% | 24.90 | 8.88 | 2.80 |
| 50% | 29.14 | 8.44 | 3.45 |
| 60% | 35.32 | 7.93 | 4.45 |

|  |  |  |  |
| --- | --- | --- | --- |
| Fractionating assemblage (Z) | (La)N | (Yb)N | (La/Yb)N |
| Amphibole | 20% | *0.17* | *0.59* |  |
| Garnet | 80% | *0.01* | *4.03* |  |
|  | Bulk D | *0.042* | *3.342* |  |
| Degree of fractionation | 0% | 16.03 | 10.24 | 1.57 |
| 10% | 17.74 | 8.00 | 2.22 |
| 20% | 19.86 | 6.07 | 3.27 |
| 30% | 22.56 | 4.44 | 5.08 |
| 40% | 26.16 | 3.09 | 8.45 |
| 50% | 31.15 | 2.02 | 15.43 |
| 60% | 38.57 | 1.20 | 32.22 |

|  |  |  |  |
| --- | --- | --- | --- |
| Note: |  |  |  |
| *Values in italics are partition coefficients* |  |
| *\*Ma et al. (2015, Earth and Planetary Science Letters)* |
| *\*\*Elliot et al. (1997, Journal of Geophysical Research)* |
| *#Partition coefficients for La, Sr and Yb are from McKenzie and O'Nions (1991, Journal of Petrology)* |
| *aRudnick and Gao (2003, Treatise in Geochemistry)* |
| *bStracke et al. (2003, Geochemistry Geophysics Geosystems)* |
| *cSisson (1994, Chemical Geology)* |  |
| *dJohnson (1998, Contributions to Mineralogy and Petrology)* |