

### **Description of Supplementary Files**

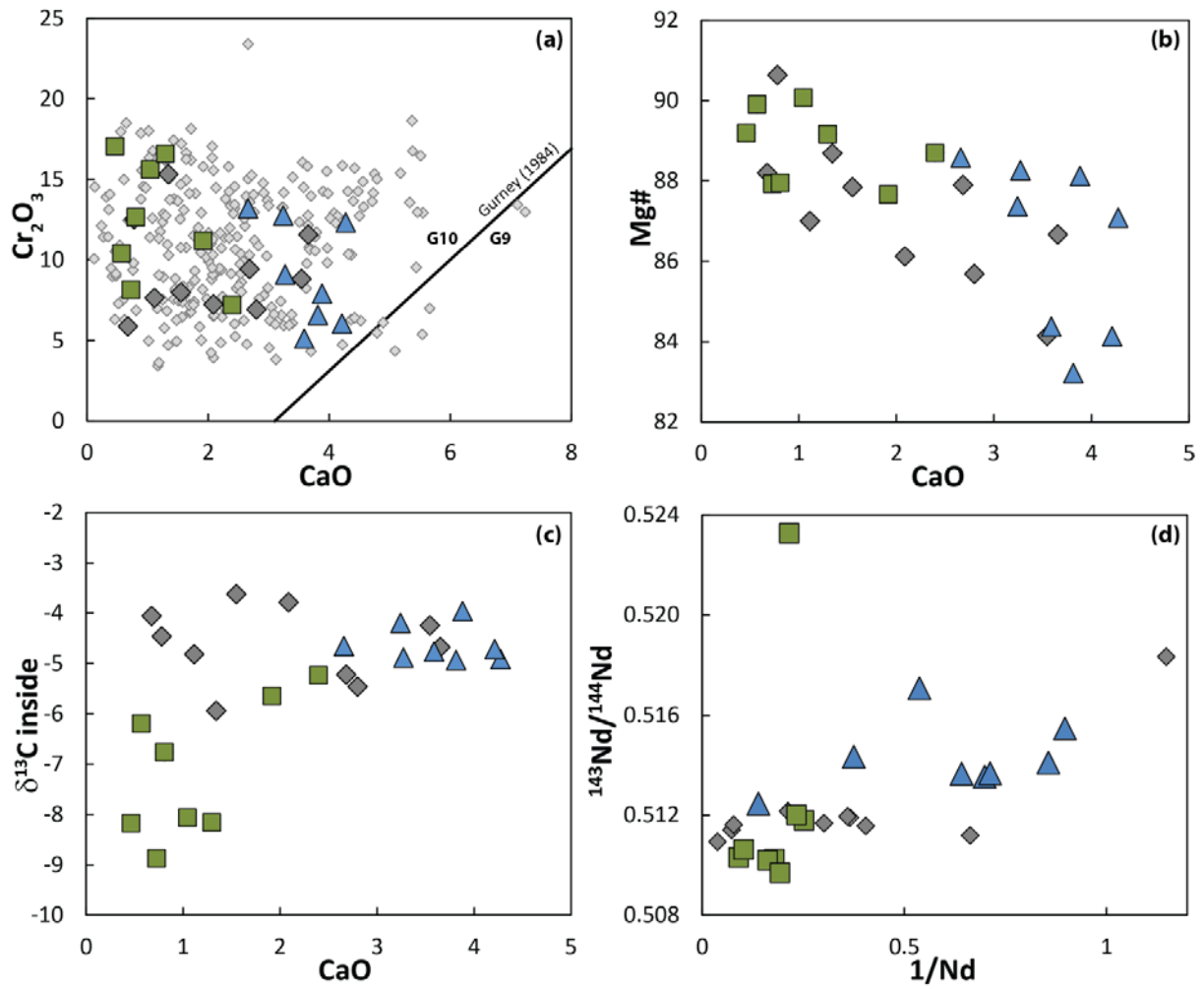
File Name: Supplementary Information

Description: Supplementary Figures, Supplementary Tables and Supplementary References

File Name: Supplementary Data 1

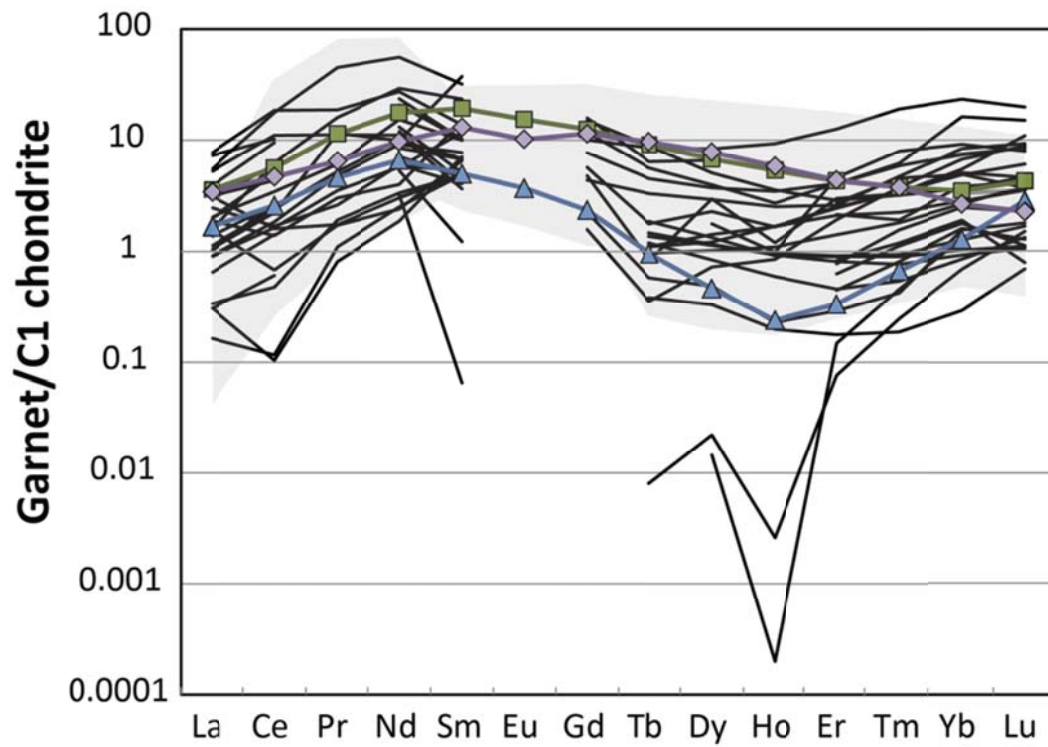
Description: Garnet inclusions major and trace element contents

File Name: Peer Review File



### Supplementary Figure 1

Plots of  $\text{Cr}_2\text{O}_3$ , #Mg and carbon isotopes versus  $\text{CaO}$  for all garnet inclusions (a), (b) and (c) and between Nd isotope compositions and reciprocal Nd, (d). Symbols as in Figure 2 in main text. Small light grey diamonds in (a) are garnet inclusion data from Venetia by Richardson et al., 2009<sup>1</sup>.



### Supplementary Figure 2

Chondrite normalised rare earth patterns for all garnet inclusions including three inclusions (colored lines with symbols) that were not dated (see methods). The grey field represents SIMS data for garnet inclusions from Stachel et al., 2004<sup>2</sup>. Note that Sm and Nd concentrations for the inclusions processed through chemistry, are determined by ID-TIMS (Supplementary Table 2).

## Supplementary Table 1

Carbon isotopes in host diamonds

| Sample | Age    | $\delta^{13}\text{C}$ | $\delta^{13}\text{C}$ |
|--------|--------|-----------------------|-----------------------|
|        | Group* | inside†               | rim                   |
| V306   | -      | -4.057                | -4.378                |
| V327   | -      | -5.219                | -5.476                |
| V379   | 3.0    | -6.191                | -5.115                |
| V405   | 3.0    | -8.064                | -7.393                |
| V408   | 3.0    | -5.234                | -5.026                |
| V445   | 1.1    | n.a.                  | -3.960                |
| V471   | -      | -3.620                | -3.097                |
| V488   | 3.0    | -8.872                | -8.802                |
| V491   | -      | -3.785                | -3.858                |
| V517   | 3.0    | -8.158                | -8.268                |
| V526   | -      | -5.455                | -5.077                |
| V536   | -      | -4.459                | -4.924                |
| V556   | 1.1    | -4.908                | -5.149                |
| V569   | 1.1    | -4.881                | -3.986                |
| V576   | -      | -5.935                | -5.479                |
| V583   | 1.1    | -4.713                | -4.310                |
| V592   | 3.0    | -6.767                | -5.420                |
| V601   | 3.0    | -5.647                | -5.507                |
| V617   | -      | -4.244                | -4.224                |
| V641   | 1.1    | -4.191                | -4.149                |
| V662   | 1.1    | -4.649                | -4.374                |
| V663   | -      | -4.812                | -4.914                |
| V670   | -      | -4.672                | -4.722                |
| V674   | 1.1    | -4.931                | -4.515                |
| V679   | 1.1    | -4.759                | -4.571                |
| V683   | 3.0    | -8.178                | -4.548                |

\* Age group as in Table S1

† Inside fragments were picked fragments without crystal faces.

## Supplementary Table 2

### Sm-Nd concentrations and isotope compositions

| Sample | Age   | weight | Nd     | Sm     | $^{147}\text{Sm}/^{144}\text{Nd}$ | $^{143}\text{Nd}/^{144}\text{Nd}_m$ | 2SE     | $^{143}\text{Nd}/^{144}\text{Nd}_e$ | TDM  |
|--------|-------|--------|--------|--------|-----------------------------------|-------------------------------------|---------|-------------------------------------|------|
|        | group | mg     | ppm    | ppm    |                                   |                                     |         |                                     | Ga   |
| V306   | -     | 0.145  | 1.508  | 0.0099 | 0.004                             | 0.51119                             | 0.00007 | 0.51118                             | 1.34 |
| V327   | -     | 0.212  | 2.736  | 0.8053 | 0.178                             | 0.51191                             | 0.00004 | 0.51130                             | 4.14 |
| V379   | 3.0   | 0.128  | 5.594  | 0.6349 | 0.069                             | 0.51024                             | 0.00004 | 0.51001                             | 2.84 |
| V405   | 3.0   | 0.089  | 11.059 | 1.5680 | 0.086                             | 0.51031                             | 0.00004 | 0.51002                             | 3.11 |
| V408   | 3.0   | 0.070  | 3.961  | 1.0270 | 0.157                             | 0.51179                             | 0.00006 | 0.51125                             | 3.08 |
| V445   | 1.1   | 0.230  | 1.430  | 0.7217 | 0.305                             | 0.51353                             | 0.00005 | 0.51249                             | 0.76 |
| V471   | -     | 0.182  | 2.470  | 0.1871 | 0.046                             | 0.51157                             | 0.00005 | 0.51141                             | 1.34 |
| V488   | 3.0   | 0.061  | 6.162  | 0.7752 | 0.076                             | 0.51020                             | 0.00007 | 0.50994                             | 3.02 |
| V491   | -     | 0.119  | 3.317  | 0.7077 | 0.129                             | 0.51168                             | 0.00006 | 0.51124                             | 2.34 |
| V517   | 3.0   | 0.054  | 9.701  | 1.5664 | 0.098                             | 0.51063                             | 0.00004 | 0.51030                             | 3.02 |
| V526   | -     | 0.023  | 26.223 | 4.9179 | 0.113                             | 0.51094                             | 0.00003 | 0.51056                             | 3.02 |
| V536   | -     | 0.052  | 13.693 | 3.6049 | 0.159                             | 0.51141                             | 0.00004 | 0.51086                             | 4.10 |
| V556   | 1.1   | 0.052  | 2.663  | 1.7908 | 0.407                             | 0.51433                             | 0.00007 | 0.51294                             | 1.00 |
| V569   | 1.1   | 0.026  | 1.114  | 0.9933 | 0.540                             | 0.51547                             | 0.00016 | 0.51363                             | 1.13 |
| V576   | -     | 0.046  | 12.810 | 2.1084 | 0.100                             | 0.51162                             | 0.00007 | 0.51128                             | 1.85 |
| V583   | 1.1   | 0.055  | 1.167  | 0.7409 | 0.384                             | 0.51409                             | 0.00010 | 0.51278                             | 0.92 |
| V592   | 3.0   | 0.120  | 4.637  | 5.7519 | 0.752                             | 0.52326                             | 0.00005 | 0.52070                             | 2.90 |
| V601   | 3.0   | 0.088  | 4.274  | 1.1817 | 0.167                             | 0.51201                             | 0.00005 | 0.51144                             | 3.05 |
| V617   | -     | 0.049  | 2.778  | 0.6191 | 0.135                             | 0.51195                             | 0.00015 | 0.51149                             | 2.03 |
| V641   | 1.1   | 0.082  | 7.164  | 1.5328 | 0.129                             | 0.51246                             | 0.00005 | 0.51202                             | 1.07 |
| V662   | 1.1   | 0.019  | 1.859  | 2.2720 | 0.740                             | 0.51708                             | 0.00023 | 0.51456                             | 1.17 |
| V663   | -     | 0.063  | 4.702  | 1.0355 | 0.133                             | 0.51216                             | 0.00005 | 0.51170                             | 1.64 |
| V670   | -     | 0.070  | 0.871  | 1.0818 | 0.752                             | 0.51833                             | 0.00033 | 0.51577                             | 1.50 |
| V674   | 1.1   | 0.064  | 1.558  | 0.7398 | 0.287                             | 0.51364                             | 0.00022 | 0.51267                             | 1.24 |
| V679   | 1.1   | 0.050  | 1.404  | 0.7338 | 0.316                             | 0.51366                             | 0.00009 | 0.51258                             | 0.88 |
| V683   | 3.0   | 0.051  | 5.186  | 0.5562 | 0.065                             | 0.50970                             | 0.00007 | 0.50948                             | 3.29 |

\* Age group as in Table S1

**m** measured isotope ratio

**e** isotope ratio corrected for the Venetia kimberlite eruption age (520 Ma)

## References

- 1 Richardson, S. H., Poml, P. F., Shirey, S. B. & Harris, J. W. Age and origin of peridotitic diamonds from Venetia, Limpopo Belt, Kaapvaal-Zimbabwe craton. *Lithos* **112**, 785-792, (2009).
- 2 Stachel, T. *et al.* The trace element composition of silicate inclusions in diamonds: a review. *Lithos* **77**, 1-19, (2004).