**Supplementary Table S4**. Major element compositions used for MELTS modeling.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sample | 14ZA24B | Model 1 | LCTM85 | Model 2 | 14ZA19A | Model 3 |
| SiO2 (wt.%) | 60.05 | 59.32 | 54.3 | 53.82 | 69.53 | 68.28 |
| TiO2 | 1.62 | 1.60 | 0.97 | 0.96 | 0.39 | 0.38 |
| Al2O3 | 14.50 | 14.32 | 16.1 | 15.96 | 13.49 | 13.25 |
| Fe2O3t | 9.26 | 9.15 |  |  | 4.98 | 4.89 |
| FeOt |  |  | 10.6 | 10.51 |  |  |
| MnO | 0.13 | 0.13 | 0.22 | 0.22 | 0.08 | 0.08 |
| MgO | 1.85 | 1.83 | 6.28 | 6.22 | 0.18 | 0.18 |
| CaO | 4.19 | 4.14 | 8.48 | 8.41 | 1.72 | 1.69 |
| Na2O | 3.37 | 3.33 | 2.79 | 2.77 | 3.03 | 2.98 |
| K2O | 3.30 | 3.26 | 0.64 | 0.63 | 4.77 | 4.68 |
| P2O5 | 0.43 | 0.42 |  |  | 0.10 | 0.10 |
| H2O |  | 2.5 |  | 0.5 |  | 3.5 |
| Pressure (GPa) |  | 0.17 |  | 0.625 |  | 0.2 |
| ƒO2 |  | FMQ -0.3 |  | FMQ +1 |  | FMQ -1 |

GPa = gigapascal. FMQ = fayalite-magnetite-quartz buffer. LCTM85 = lower crust composition of Taylor and McLennan (1985).