

Supplementary File

| Units | BB | BB | BB | BB | BB | BB | BB | BAT | BAT | BAT | BAT | BAT | BAT | |
|--------------------------------|--------|--------|-------|--------|--------|-------|-------|--------|-----------|----------|-----------|----------|--------|--------|
| # of sample | 95831 | 95814 | 95813 | 95803 | 95524 | 93904 | 93903 | 95834 | 95833a | 95833b | 95802a | 95802b | 95801 | 95525a |
| Location (MGS) | X | 53 04 | 53 67 | 53 88 | 52 40 | 54 67 | 55 26 | 52 83 | 52 40 | 52 14 | 51 81 | 52 41 | 52 52 | |
| | Y | 69 17 | 66 98 | 65 50 | 65 79 | 66 45 | 66 06 | 68 74 | 70 00 | 65 64 | 65 93 | 70 01 | 69 71 | |
| XRF pumic | | | | | | | | | mix pumic | 1 pumice | mix pumic | 1 pumice | mix | |
| SiO ₂ | 75.34 | 74.08 | 73.16 | 74.02 | 74.72 | 76.01 | 74.12 | 73.55 | 73.67 | 73.65 | 74.47 | 74.11 | 74.08 | 74.02 |
| TiO ₂ | 0.30 | 0.33 | 0.33 | 0.32 | 0.31 | 0.27 | 0.29 | 0.33 | 0.34 | 0.33 | 0.30 | 0.31 | 0.34 | 0.33 |
| Al ₂ O ₃ | 13.38 | 13.81 | 14.28 | 13.65 | 13.67 | 12.34 | 12.90 | 14.05 | 13.82 | 13.76 | 13.66 | 13.69 | 13.38 | 13.59 |
| FeO | 1.6 | 1.78 | 1.81 | 1.76 | 1.66 | 1.46 | 1.66 | 1.98 | 1.98 | 1.85 | 1.69 | 1.83 | 1.83 | 1.91 |
| MnO | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.06 |
| MgO | 0.61 | 0.71 | 0.75 | 0.64 | 0.64 | 0.92 | 0.96 | 0.63 | 0.71 | 0.69 | 0.56 | 0.59 | 0.58 | 0.59 |
| CaO | 1.35 | 1.67 | 1.76 | 1.54 | 1.55 | 1.57 | 1.69 | 1.72 | 1.81 | 1.63 | 1.45 | 1.44 | 1.46 | 1.45 |
| Na ₂ O | 3.88 | 3.93 | 3.81 | 3.86 | 3.95 | 3.24 | 3.53 | 3.66 | 3.53 | 3.64 | 3.60 | 3.56 | 4.41 | 3.65 |
| K ₂ O | 4.06 | 3.91 | 3.94 | 3.95 | 3.93 | 4.02 | 4.02 | 3.94 | 4.08 | 4.14 | 4.21 | 4.26 | 4.12 | 4.20 |
| P ₂ O ₅ | 0.10 | 0.10 | 0.12 | 0.10 | 0.10 | 0.11 | 0.10 | 0.10 | 0.11 | 0.09 | 0.09 | 0.10 | 0.10 | 0.09 |
| Total | 100.67 | 100.37 | 99.88 | 100.34 | 100.58 | 99.89 | 99.32 | 100.01 | 100.11 | 99.84 | 100.08 | 99.94 | 100.35 | 99.95 |
| XRF | | | | | | | | | | | | | | |
| Rb | 167 | 147 | 143 | 148 | 151 | 155 | 154 | 139 | 140 | 141 | 150 | 147 | 141 | 145 |
| Sr | 156 | 200 | 213 | 189 | 188 | 174 | 194 | 239 | 217 | 196 | 197 | 187 | 191 | 190 |
| Zr | 132 | 136 | 137 | 139 | 135 | 132 | 137 | 146 | 151 | 138 | 135 | 140 | 142 | 142 |
| Y | 32 | 30 | 30 | 30 | 28 | 26 | 27 | 30 | 29 | 28 | 30 | 28 | 27 | 27 |
| Nb | 42 | 35 | 36 | 37 | 35 | 42 | 41 | 36 | 38 | 37 | 36 | 38 | 33 | 32 |
| Ba | 518 | 558 | 568 | 568 | 532 | 569 | 559 | 607 | 643 | 618 | 563 | 608 | 622 | 620 |
| Th | 22 | 20 | 22 | 20 | 22 | 20 | 20 | 17 | 20 | 21 | 20 | 22 | 21 | 18 |
| INAA | | | | | | | | | | | | | | |
| La | | | | 41.7 | | | | | | | | | | 40.2 |
| Ce | | | | 73 | | | | | | | | | | 70 |
| Nd | | | | 25 | | | | | | | | | | 23 |
| Sm | | | | 4.14 | | | | | | | | | | 4.00 |
| Eu | | | | 0.58 | | | | | | | | | | 0.60 |
| Tb | | | | 0.5 | | | | | | | | | | 0.4 |
| Yb | | | | 3.60 | | | | | | | | | | 3.25 |
| Lu | | | | 0.55 | | | | | | | | | | 0.49 |
| Ta | | | | 4.60 | | | | | | | | | | 3.70 |
| Th | | | | 20.0 | | | | | | | | | | 18.3 |
| Hf | | | | 4.3 | | | | | | | | | | 4.3 |
| Rb | | | | 136 | | | | | | | | | | 141 |
| Sc | | | | 4.02 | | | | | | | | | | 3.98 |

Table 1: Continued

| Units | BAT | BAT | BAT | BAT | BAT | BAT | ECP | ECP | ECP | ECP | ECP | ECP | ECP | ECP | ECP | |
|--------------------------------|----------|--------|-------|-------|-------|-------|----------|-------|-------|--------|--------|-------|-----------|-------|-------|-------|
| # of sample | 95525b | 95525c | 95503 | 95502 | 95501 | 93902 | 95838 | 95837 | 95836 | 95825a | 95825b | 95824 | 95822 | 95821 | 93907 | 93906 |
| Location (MGS) | X | 52 52 | 51 64 | 51 64 | 51 71 | 56 32 | 56 31 | 56 29 | | 60 55 | | 60 55 | 54 57 | 57 02 | 60 86 | 60 86 |
| | Y | 69 71 | 65 92 | 65 92 | 65 92 | 65 90 | 65 90 | 65 91 | 65 90 | | 64 50 | | 64 50 | 57 29 | 58 79 | 64 31 |
| XRF | 1 pumice | | | | | | 1 pumice | | | | | | mix pumic | | | |
| SiO ₂ | 73.92 | 73.80 | 73.75 | 72.36 | 73.37 | 75.02 | 73.13 | 72.19 | 73.14 | 73.54 | 73.91 | 72.38 | 73.96 | 72.76 | 72.72 | 73.07 |
| TiO ₂ | 0.33 | 0.33 | 0.35 | 0.39 | 0.34 | 0.30 | 0.35 | 0.35 | 0.34 | 0.34 | 0.32 | 0.38 | 0.32 | 0.35 | 0.33 | 0.36 |
| Al ₂ O ₃ | 13.61 | 13.65 | 13.66 | 14.50 | 13.91 | 12.76 | 14.10 | 14.33 | 14.13 | 13.94 | 13.91 | 14.53 | 13.93 | 14.77 | 13.58 | 14.52 |
| FeO | 1.89 | 1.91 | 1.98 | 2.24 | 1.96 | 1.65 | 2.09 | 2.09 | 2.02 | 2.05 | 1.92 | 2.33 | 1.98 | 2.17 | 1.98 | 2.22 |
| MnO | 0.05 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.06 | 0.06 | 0.06 | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.06 |
| MgO | 0.61 | 0.63 | 0.67 | 0.77 | 0.67 | 1.04 | 0.83 | 0.66 | 0.60 | 0.60 | 0.60 | 0.75 | 0.59 | 0.62 | 0.83 | 0.85 |
| CaO | 1.50 | 1.46 | 1.51 | 1.90 | 1.62 | 1.81 | 1.66 | 1.71 | 1.62 | 1.66 | 1.53 | 1.90 | 1.50 | 1.64 | 1.71 | 1.63 |
| Na ₂ O | 3.81 | 3.75 | 3.61 | 3.80 | 3.75 | 3.31 | 3.90 | 3.84 | 3.83 | 3.49 | 3.47 | 3.71 | 3.35 | 3.38 | 3.13 | 2.83 |
| K ₂ O | 4.11 | 4.17 | 4.19 | 3.89 | 4.07 | 3.93 | 3.95 | 4.04 | 4.01 | 4.05 | 4.13 | 3.85 | 4.19 | 3.97 | 4.16 | 4.22 |
| P ₂ O ₅ | 0.09 | 0.09 | 0.10 | 0.08 | 0.09 | 0.12 | 0.10 | 0.10 | 0.10 | 0.10 | 0.09 | 0.11 | 0.10 | 0.12 | 0.09 | 0.11 |
| Total | 99.92 | 99.85 | 99.87 | 99.92 | 99.83 | 99.88 | 100.3 | 99.5 | 99.97 | 99.95 | 100.06 | 99.89 | 99.90 | 99.97 | 98.7 | 98.08 |
| XRF | | | | | | | | | | | | | | | | |
| Rb | 147 | 143 | 142 | 135 | 143 | 146 | 140 | 141 | 143 | 139 | 145 | 135 | 147 | 137 | 149 | 156 |
| Sr | 188 | 187 | 186 | 267 | 213 | 212 | 226 | 230 | 227 | 230 | 202 | 270 | 202 | 212 | 222 | 211 |
| Zr | 144 | 145 | 148 | 143 | 142 | 141 | 143 | 144 | 141 | 146 | 140 | 148 | 148 | 154 | 141 | 159 |
| Y | 29 | 29 | 30 | 27 | 29 | 19 | 27 | 26 | 29 | 28 | 28 | 29 | 30 | 30 | 26 | 29 |
| Nb | 35 | 33 | 35 | 30 | 31 | 38 | 34 | 33 | 33 | 35 | 35 | 34 | 36 | 41 | 40 | 44 |
| Ba | 597 | 617 | 591 | 649 | 595 | 588 | 635 | 621 | 626 | 620 | 509 | 654 | 602 | 633 | 668 | 766 |
| Th | 22 | 21 | 21 | 22 | | 19 | 19 | 22 | 23 | 19 | 22 | 23 | 21 | 20 | 21 | 19 |
| INAA | | | | | | | | | | | | | | | | |
| La | | | | 38.2 | | | | | | | | 43.6 | 41.1 | | | 41.5 |
| Ce | | | | 66 | | | | | | | | 79 | 72 | | | 72 |
| Nd | | | | 22 | | | | | | | | 27 | 24 | | | 23 |
| Sm | | | | 3.97 | | | | | | | | 4.33 | 4.15 | | | 4.07 |
| Eu | | | | 0.74 | | | | | | | | 0.64 | 0.63 | | | 0.58 |
| Tb | | | | 0.5 | | | | | | | | 0.5 | 0.4 | | | 0.5 |
| Yb | | | | 3.14 | | | | | | | | 3.48 | 3.51 | | | 3.61 |
| Lu | | | | 0.47 | | | | | | | | 0.55 | 0.55 | | | 0.54 |
| Ta | | | | 4.10 | | | | | | | | 3.40 | 3.80 | | | 3.80 |
| Th | | | | 17.7 | | | | | | | | 21.1 | 19.6 | | | 19.3 |
| Hf | | | | 4.0 | | | | | | | | 4.8 | 4.6 | | | 4.1 |
| Rb | | | | 130 | | | | | | | | 131 | 150 | | | 147 |
| Sc | | | | 4.41 | | | | | | | | 4.53 | 4.22 | | | 4.02 |

Table 1: Continued

| Units | SMR | SMR | SMR | SMR | SMR | SMR | SMR | SMR | SMR | SMR | BT | BT | BT | BT | BT |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|--------|--------|--------|-------|-------|
| # of sample | 95843 | 95842 | 95841 | 95812 | 95811 | 95523 | 95522 | 95505 | 93908 | 93905 | 95835 | 95531a | 95531b | 95521 | 95504 |
| Location (MGS) | X | 59 96 | 57 38 | 57 87 | 54 21 | 54 29 | 61 69 | 62 83 | 54 90 | 61 50 | 56 07 | 52 55 | 85 30 | 74 05 | 49 60 |
| | Y | 65 44 | 65 73 | 65 69 | 64 98 | 64 74 | 64 79 | 64 38 | 64 19 | 64 31 | 65 93 | 73 76 | 61 20 | 73 10 | 76 65 |
| XRF | | | | | | | | | | | | | | | |
| SiO ₂ | 77.76 | 77.76 | 76.95 | 77.11 | 76.56 | 77.68 | 78.02 | 77.62 | 79.28 | 77.23 | 77.43 | 77.56 | 77.68 | 75.08 | 75.59 |
| TiO ₂ | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.12 | 0.11 | 0.12 | 0.16 | 0.06 | 0.06 | 0.16 | 0.09 |
| Al ₂ O ₃ | 13.02 | 13.09 | 13.15 | 13.18 | 13.37 | 12.94 | 12.77 | 12.93 | 11.44 | 11.66 | 13.36 | 12.28 | 12.41 | 13.21 | 13.77 |
| FeO | 0.83 | 0.75 | 0.76 | 0.79 | 0.83 | 0.82 | 0.78 | 0.82 | 0.75 | 0.92 | 0.76 | 1.30 | 1.3 | 1.55 | 1.33 |
| MnO | 0.04 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.06 | 0.04 | 0.07 | 0.07 | 0.03 | 0.07 |
| MgO | 0.15 | 0.17 | 0.17 | 0.18 | 0.15 | 0.16 | 0.16 | 0.16 | 0.28 | 0.21 | 0.25 | 0.08 | 0.08 | 0.02 | 0.00 |
| CaO | 0.51 | 0.50 | 0.54 | 0.54 | 0.52 | 0.51 | 0.49 | 0.52 | 0.58 | 0.58 | 0.65 | 0.29 | 0.27 | 0.09 | 0.00 |
| Na ₂ O | 3.98 | 3.78 | 4.16 | 4.11 | 3.97 | 3.99 | 3.98 | 3.73 | 3.00 | 3.37 | 3.50 | 4.22 | 4.18 | 4.26 | 4.42 |
| K ₂ O | 4.37 | 4.38 | 4.39 | 4.43 | 4.37 | 4.33 | 4.41 | 4.61 | 4.45 | 4.56 | 4.76 | 4.09 | 4.11 | 4.60 | 4.67 |
| P ₂ O ₅ | 0.06 | 0.05 | 0.05 | 0.06 | 0.05 | 0.06 | 0.05 | 0.05 | 0.05 | 0.03 | 0.05 | 0.05 | 0.05 | 0.06 | 0.06 |
| Total | 100.9 | 100.7 | 100.4 | 100.6 | 99.95 | 100.7 | 100.8 | 100.61 | 99.95 | 98.74 | 100.96 | 99.95 | 100.21 | 99.06 | 99.94 |
| XRF | | | | | | | | | | | | | | | |
| Rb | 216 | 210 | 215 | 215 | 211 | 212 | 223 | 218 | 242 | 236 | 180 | 235 | 230 | 99 | 152 |
| Sr | 29 | 31 | 29 | 31 | 30 | 30 | 28 | 29 | 27 | 27 | 52 | 22 | 20 | 33 | 19 |
| Zr | 113 | 104 | 107 | 105 | 114 | 112 | 108 | 107 | 106 | 120 | 126 | 212 | 207 | 292 | 236 |
| Y | 56 | 55 | 54 | 56 | 57 | 53 | 59 | 56 | 52 | 61 | 45 | 87 | 85 | 35 | 45 |
| Nb | 70 | 69 | 66 | 73 | 76 | 76 | 75 | 76 | 133 | 89 | 53 | 120 | 118 | 52 | 79 |
| Ba | 111 | 118 | 121 | 112 | 112 | 114 | 112 | 111 | 138 | 137 | 157 | 45 | 38 | 168 | 108 |
| Th | 32 | 32 | 30 | 30 | 31 | 28 | 31 | 30 | 27 | 32 | 24 | 28 | 26 | 14 | 22 |
| INAA | | | | | | | | | | | | | | | |
| La | | | | | | 40.8 | | | | 36.7 | | | | | |
| Ce | | | | | | 86 | | | | 75 | | | | | |
| Nd | | | | | | 30 | | | | 29 | | | | | |
| Sm | | | | | | 6.58 | | | | 5.91 | | | | | |
| Eu | | | | | | 0.34 | | | | 0.31 | | | | | |
| Tb | | | | | | 1.0 | | | | 1.0 | | | | | |
| Yb | | | | | | 6.56 | | | | 6.58 | | | | | |
| Lu | | | | | | 0.95 | | | | 0.96 | | | | | |
| Ta | | | | | | 7.20 | | | | 6.30 | | | | | |
| Th | | | | | | 31.1 | | | | 28.4 | | | | | |
| Hf | | | | | | 5.0 | | | | 4.7 | | | | | |
| Rb | | | | | | 194 | | | | 208 | | | | | |
| Sc | | | | | | 2.46 | | | | 2.73 | | | | | |

Table 1: XRF major and trace element chemical analyses and INAA REE analyses for ECS, SMR, and Bandelier Tuff (BT).

| Feldspar | | | | | | Pyroxene | | | | | Biotite | | | |
|--------------------------------|-------|--------|--------|--------|--------|--------------------------------|-------|-------|--------|--------|--------------------------------|--------|-------|-------|
| | BB | BB | BAT | SMR | SMR | | BB | BB | BAT | BAT | | BB | BAT | SMR |
| wt% | D2-kf | B1-2pl | D30-pl | A1-kf | A1 pl | wt% | A2cpx | A2opx | F10cpx | F10opx | wt% | B2-2Bi | E6-Bi | A2-Bi |
| | 95831 | 95831 | 95832 | 95843 | 95843 | | 95803 | 95803 | 95832 | 95832 | | 95831 | 95832 | 95811 |
| SiO ₂ | 64.63 | 57.80 | 59.72 | 66.59 | 64.82 | SiO ₂ | 52.75 | 53.19 | 52.46 | 53.73 | SiO ₂ | 39.60 | 39.88 | 38.63 |
| Al ₂ O ₃ | 19.67 | 26.59 | 24.55 | 19.73 | 22.15 | TiO ₂ | 0.13 | 0.19 | 0.11 | 0.11 | TiO ₂ | 4.28 | 3.80 | 3.10 |
| FeO* | 0.19 | 0.33 | 0.27 | 0.10 | 0.20 | Al ₂ O ₃ | 0.69 | 0.93 | 0.33 | 0.38 | Al ₂ O ₃ | 12.89 | 13.04 | 12.21 |
| CaO | 0.23 | 8.72 | 7.22 | 0.18 | 3.04 | FeO* | 10.68 | 18.96 | 9.09 | 19.05 | FeO* | 11.80 | 11.58 | 16.52 |
| Na ₂ O | 4.94 | 6.83 | 7.45 | 4.60 | 9.12 | MnO | 0.79 | 0.78 | 0.27 | 0.69 | MnO | 0.18 | 0.29 | 0.10 |
| K ₂ O | 9.76 | 0.51 | 0.83 | 10.68 | 1.36 | MgO | 12.83 | 24.08 | 14.54 | 24.02 | MgO | 18.54 | 18.26 | 13.85 |
| | | | | | | CaO | 21.25 | 1.16 | 22.33 | 1.15 | CaO | 0.00 | 0.29 | 0.00 |
| | | | | | | Na ₂ O | 0.40 | 0.04 | 0.24 | 0.03 | Na ₂ O | 0.71 | 0.49 | 0.38 |
| | | | | | | K ₂ O | 0.00 | 0.00 | 0.00 | 0.02 | K ₂ O | 9.33 | 8.28 | 9.68 |
| Total | 99.42 | 100.78 | 100.03 | 101.87 | 100.69 | Total | 99.52 | 99.32 | 99.38 | 99.17 | Total | 97.32 | 95.90 | 94.47 |
| | | | | | | Fe ₂ O ₃ | 0.27 | 0.63 | 2.45 | | | | | |
| | | | | | | FeO | 10.44 | 18.40 | 6.89 | 19.05 | | | | |
| Atoms | | | | | | Atoms | | | | | | | | |
| Si | 2.95 | 2.58 | 2.67 | 2.97 | 2.85 | Si | 1.99 | 1.97 | 1.98 | 1.99 | | | | |
| Al | 1.06 | 1.40 | 1.30 | 1.04 | 1.15 | Ti | 0.00 | 0.01 | 0.00 | 0.00 | | | | |
| Fe | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | Al | 0.03 | 0.04 | 0.01 | 0.02 | | | | |
| Ca | 0.01 | 0.42 | 0.35 | 0.01 | 0.14 | Fe ³⁺ | 0.01 | 0.02 | 0.07 | | | | | |
| Na | 0.44 | 0.59 | 0.65 | 0.40 | 0.78 | Fe ²⁺ | 0.33 | 0.60 | 0.22 | 0.59 | | | | |
| K | 0.57 | 0.03 | 0.05 | 0.61 | 0.08 | Mn | 0.03 | 0.02 | 0.01 | 0.02 | | | | |
| | | | | | | Mg | 0.72 | 1.33 | 0.82 | 1.33 | | | | |
| | | | | | | Ca | 0.86 | 0.05 | 0.90 | 0.05 | | | | |
| | | | | | | Na | 0.03 | 0.00 | 0.02 | 0.00 | | | | |
| | | | | | | K | 0.00 | 0.00 | 0.00 | 0.00 | | | | |
| Sum | 5.02 | 5.03 | 5.02 | 5.02 | 5.00 | Sum | 4.00 | 4.01 | 4.02 | 4.00 | | | | |
| Mol % | | | | | | Wo/Ca | 0.433 | 0.024 | 0.445 | 0.023 | | | | |
| An | 1.14 | 41.63 | 34.52 | 0.84 | 15.04 | En/Mg | 0.389 | 0.681 | 0.425 | 0.675 | | | | |
| Ab | 42.06 | 55.51 | 60.75 | 37.81 | 76.95 | Fs/Fe ²⁺ | 0.179 | 0.295 | 0.130 | 0.302 | | | | |
| Or | 58.03 | 2.86 | 4.73 | 61.36 | 8.01 | | | | | | | | | |
| T (°C) ¹ a | | 791 | | | 707 | T (°C) ² | 720 | 820 | 700 | 810 | | | | |
| b | | 798 | | | 697 | | | | | | | | | |
| c | | 768 | | | 717 | | | | | | | | | |

* Total iron measured as FeO.

** Fe₂O₃ and formulas calculated by recommendations of Robinson and others (1982)

T (°C)¹, Temperature calculated from SOLVCALC 2 (Wen, 1996)

a-Elkins and Grove (1990)

b-Lindsley and Nekvasil (1989)

c-Fuhrman and Lindsley (1988)

T (°C)²

Temperature (1 atm plot) from Lindsley (1983)

Table 2: Continued

| wt% | Hornblende | | | | | | Fe-Ti Oxides | | | | | | |
|-----------------------------------|------------|--------|--------|--------|--------|--------|--------------------------------|-------|-------|-------|--------|-------|--------|
| | BB | BB | BAT | BAT | SMR | SMR | BB | BB | BAT | BAT | SMR | SMR | |
| | 95831 | 95803 | 95832 | 93902 | 95843 | 95811 | wt% | 95831 | 95831 | 95832 | 95832 | 95811 | 95811 |
| | A2-2Hb | D-3 Hb | E-1 Hb | B-2 Hb | A-6 Hb | B3-Hb | 6 mt | 2 il | G8 mt | G1 il | X1 mt | X1 il | |
| SiO ₂ | 45.18 | 44.33 | 45.16 | 45.05 | 47.54 | 46.20 | SiO ₂ | 0.05 | 0.02 | 0.13 | 0.00 | 0.10 | 0.04 |
| TiO ₂ | 1.73 | 1.90 | 1.38 | 1.75 | 0.81 | 0.87 | TiO ₂ | 6.53 | 38.26 | 7.03 | 41.31 | 7.59 | 48.56 |
| Al ₂ O ₃ | 8.14 | 8.04 | 7.80 | 8.30 | 6.11 | 6.02 | Al ₂ O ₃ | 1.80 | 0.18 | 1.71 | 0.18 | 0.80 | 0.00 |
| FeO* | 12.29 | 12.22 | 13.42 | 12.23 | 13.76 | 19.07 | FeO* | 84.81 | 57.55 | 83.54 | 54.53 | 85.38 | 46.99 |
| MnO | 0.33 | 0.69 | 0.79 | 0.28 | 1.46 | 0.93 | MnO | 0.52 | 0.57 | 0.57 | 0.63 | 1.58 | 3.46 |
| MgO | 14.76 | 14.79 | 13.61 | 14.55 | 14.45 | 10.90 | MgO | 1.37 | 1.99 | 1.49 | 1.98 | 0.41 | 0.91 |
| CaO | 11.70 | 11.61 | 11.79 | 11.44 | 11.20 | 11.07 | CaO | 0.02 | 0.03 | 0.12 | 0.02 | 0.01 | 0.00 |
| Na ₂ O | 1.84 | 1.66 | 1.79 | 1.72 | 1.87 | 1.68 | ZnO | 0.11 | 0.00 | 0.12 | 0.03 | 0.17 | 0.04 |
| K ₂ O | 0.75 | 0.64 | 0.65 | 0.74 | 0.78 | 0.76 | Total | 95.21 | 98.60 | 94.71 | 98.67 | 96.04 | 99.98 |
| Total | 97.28 | 96.62 | 96.86 | 96.68 | 98.74 | 98.16 | | | | | | | |
| Fe ₂ O ₃ ** | 5.62 | 7.46 | 4.75 | 6.10 | 7.69 | 6.65 | | | | | | | |
| FeO | 7.23 | 5.50 | 9.14 | 6.77 | 6.84 | 13.09 | | | | | | | |
| Atoms** | | | | | | | | | | | | | |
| Si | 6.626 | 6.542 | 6.703 | 6.631 | 6.895 | 6.909 | | | | | | | |
| Al | 1.407 | 1.398 | 1.365 | 1.440 | 1.044 | 1.061 | | | | | | | |
| Fe ³⁺ | 0.621 | 0.828 | 0.531 | 0.675 | 0.839 | 0.749 | | | | | | | |
| Ti | 0.190 | 0.211 | 0.154 | 0.194 | 0.088 | 0.098 | | | | | | | |
| Mg | 3.228 | 3.255 | 3.012 | 3.192 | 3.124 | 2.430 | | | | | | | |
| Fe | 0.886 | 0.679 | 1.135 | 0.834 | 0.830 | 1.637 | | | | | | | |
| Mn | 0.041 | 0.087 | 0.099 | 0.034 | 0.179 | 0.118 | | | | | | | |
| Ca | 1.838 | 1.836 | 1.876 | 1.804 | 1.741 | 1.773 | | | | | | | |
| Na | 0.523 | 1.467 | 0.515 | 0.490 | 0.526 | 0.486 | | | | | | | |
| K | 0.141 | 0.121 | 0.123 | 0.138 | 0.144 | 0.145 | | | | | | | |
| Sum | 15.501 | 16.424 | 15.513 | 15.432 | 15.410 | 15.406 | | | | | | | |
| | | | | | | | Xusp | 18.60 | | 19.60 | | 21.20 | |
| | | | | | | | Xil | | 71.70 | | 77.50 | | 91.20 |
| P (kb) (1) | 3.16 | 3.11 | 2.95 | 3.32 | 1.33 | 1.42 | T (°C) (3) | | 833.8 | | 823 | | 738.9 |
| P (kb) (2) | 3.18 | 3.12 | 2.94 | 3.36 | 1.13 | 1.22 | log f _{O₂} | | -11.4 | | -11.82 | | -14.85 |
| P (kb) (3) | 2.49 | 2.45 | 2.31 | 2.63 | 0.96 | 1.03 | T (°C) (4) | | 885 | | 865 | | 748 |
| P (kb) (4) | 3.69 | 3.64 | 3.49 | 3.84 | 1.96 | 2.04 | log f _{O₂} | | -10.3 | | -10.95 | | -14.8 |
| P (kb) (5) | 1.11 | 1.07 | 0.94 | 1.23 | 1.12 | 1.19 | | | | | | | |

P (kb)⁽¹⁾ Pressure calculated from Hammarstrom and Zen (1986)

P (kb)⁽²⁾ Pressure calculated from Hollister and others (1987)

P (kb)⁽³⁾ Pressure calculated from Johnson and Rutherford (1989)

P (kb)⁽⁴⁾ Pressure calculated from Schmidt (1992)

P (kb)⁽⁵⁾ Pressure calculated from Anderson and Smith (1995)

T (°C)⁽³⁾ Temperature and oxygen fugacity determined using Andersen and Lindsley (1988)

T (°C)⁽⁴⁾ Temperature and oxygen fugacity determined using Spencer and Lindsley (1981)

Table 2: Representative electron probe microanalyses of minerals in ECS and SMR.

| Units | BB | BAT | SMR | |
|---------------------------------------|--------------------------------|-----------------|------------------|------------------|
| Feldspar geothermometer [42] | Elkins and Grove [43] | 789°C | 709-711°C | |
| | Lindsley and Nekvasil [44] | 794°C | 678-690°C | |
| | Fuhrman and Lindsley [45] | 790°C | 708-720°C | |
| Pyroxene geothermometer Lindsley [48] | Cpx(rim) | 650-820°C | 650-800°C | |
| | Opx(rim) | 780-920°C | 780-910°C | |
| Fe-Ti oxide geothermometer | Andersen and Lindsley [62] | 832-840°C | 822-863°C | 729-773°C |
| | log f _{o₂} | -11.25 to -11.4 | -11.00 to -11.10 | -14.32 to -15.08 |

Table 3: Summary of geothermometry (Phenocryst rim average compositions).

| Units | 95803 BB | 95831 BB | 93902 BAT | 95832 BAT | 95843 SMR | 95811 SMR | |
|-----------------------------|--|----------|-----------|-----------|-----------|-----------|------|
| Formula | P kbar | P kbar | P kbar | P kbar | P kbar | P kbar | |
| Hammarstrom and Zen [49] | P=-3.92+5.03Al | 2.85 | 3.61 | 3.35 | 2.57 | 1.42 | 1.43 |
| Hollister et al. [50] | P=-4.76+5.64Al | 2.83 | 3.68 | 3.39 | 2.52 | 1.22 | 1.24 |
| Johnson and Rutherford [51] | P=-3.46+4.23Al | 2.23 | 2.87 | 2.65 | 2.00 | 1.03 | 1.04 |
| Schmidt [53] | P=-3.01+4.76Al | 3.39 | 4.11 | 3.87 | 3.13 | 2.04 | 2.05 |
| Anderson and Smith [54] | P=4.76Al-3.01- ((T(°C)-675)/85)* (0.53Al+0.005294* (T(°C)-675)) | | | | | 1.19 | 1.20 |

Table 4: Al-in-hornblende geobarometry (Amphibole rim average data).