**Table 1 Whole-rock major and trace elements of the Taolin intrusion**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit** | **Shibu unit** | | | | | | **Tiqiushan unit** | | | | | |
| **Sample** | **18TL02-3** | **18TL02-4** | **18TL02-5** | **18TL02-6** | **18TL02-7** | **18TL02-8** | **18TL03-1** | **18TL03-2** | **18TL03-3** | **18TL03-4** | **18TL03-5** | **18TL03-6** |
| SiO2 | 77.7 | 77.4 | 77.6 | 77.1 | 77.2 | 77.1 | 77.6 | 77.3 | 76.4 | 76.6 | 77.1 | 77.4 |
| TiO2 | 0.08 | 0.08 | 0.08 | 0.09 | 0.08 | 0.09 | 0.08 | 0.07 | 0.07 | 0.07 | 0.09 | 0.08 |
| Al2O3 | 12.6 | 12.3 | 12.3 | 12.5 | 12.6 | 12.6 | 12.4 | 12.2 | 12.7 | 12.6 | 12.7 | 12.7 |
| Fe2O3 | 0.10 | 0.13 | 0.11 | 0.11 | 0.11 | 0.12 | 0.11 | 0.14 | 0.14 | 0.15 | 0.14 | 0.14 |
| FeO | 0.56 | 0.76 | 0.60 | 0.64 | 0.60 | 0.68 | 0.63 | 0.77 | 0.77 | 0.83 | 0.78 | 0.80 |
| MnO | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.02 |
| MgO | 0.07 | 0.05 | 0.05 | 0.05 | 0.03 | 0.05 | 0.05 | 0.04 | 0.04 | 0.05 | 0.04 | 0.05 |
| CaO | 0.09 | 0.07 | 0.10 | 0.11 | 0.11 | 0.10 | 0.21 | 0.16 | 0.42 | 0.27 | 0.27 | 0.27 |
| Na2O | 3.72 | 3.59 | 3.66 | 3.69 | 3.83 | 3.68 | 3.91 | 4.02 | 3.98 | 3.88 | 3.88 | 3.82 |
| K2O | 4.74 | 4.80 | 4.65 | 4.93 | 4.95 | 5.11 | 4.61 | 4.39 | 4.80 | 4.88 | 4.69 | 4.74 |
| P2O5 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| LOI | 0.61 | 0.35 | 0.63 | 0.51 | 0.42 | 0.43 | 0.42 | 0.30 | 0.56 | 0.43 | 0.46 | 0.40 |
| FeOt | 0.66 | 0.89 | 0.71 | 0.76 | 0.71 | 0.80 | 0.75 | 0.91 | 0.91 | 0.98 | 0.92 | 0.94 |
| A/CNK | 1.10 | 1.09 | 1.09 | 1.08 | 1.06 | 1.07 | 1.05 | 1.04 | 1.02 | 1.04 | 1.06 | 1.07 |
| A/NK | 1.12 | 1.10 | 1.11 | 1.10 | 1.08 | 1.09 | 1.08 | 1.07 | 1.08 | 1.08 | 1.10 | 1.12 |
| La | 34.2 | 15.8 | 32.5 | 22.3 | 23.4 | 20.8 | 30.4 | 25.2 | 25.4 | 24.0 | 27.6 | 26.7 |
| Ce | 65.4 | 51.4 | 52.0 | 44.1 | 45.2 | 38.9 | 38.7 | 40.8 | 31.0 | 37.3 | 31.5 | 29.4 |
| Pr | 6.61 | 3.05 | 6.00 | 3.48 | 3.82 | 2.95 | 6.81 | 6.00 | 5.40 | 5.11 | 5.14 | 5.05 |
| Nd | 19.9 | 9.20 | 18.5 | 9.50 | 10.3 | 8.00 | 22.4 | 20.1 | 17.9 | 17.3 | 15.7 | 15.5 |
| Sm | 3.74 | 2.09 | 3.39 | 1.47 | 1.55 | 1.27 | 4.66 | 4.38 | 3.79 | 3.64 | 2.95 | 3.23 |
| Eu | 0.21 | 0.14 | 0.19 | 0.14 | 0.20 | 0.13 | 0.15 | 0.14 | 0.16 | 0.15 | 0.21 | 0.24 |
| Gd | 3.30 | 2.27 | 3.06 | 1.24 | 1.40 | 1.12 | 4.52 | 3.59 | 3.61 | 3.37 | 2.62 | 2.42 |
| Tb | 0.50 | 0.45 | 0.46 | 0.22 | 0.25 | 0.22 | 0.70 | 0.55 | 0.61 | 0.57 | 0.43 | 0.40 |
| Dy | 3.23 | 3.20 | 3.02 | 1.49 | 1.64 | 1.53 | 4.26 | 3.29 | 3.96 | 3.56 | 2.58 | 2.42 |
| Ho | 0.67 | 0.66 | 0.62 | 0.35 | 0.36 | 0.34 | 0.88 | 0.68 | 0.83 | 0.73 | 0.55 | 0.53 |
| Er | 1.94 | 1.96 | 1.86 | 1.17 | 1.26 | 1.12 | 2.46 | 1.94 | 2.59 | 2.19 | 1.56 | 1.61 |
| Tm | 0.31 | 0.32 | 0.29 | 0.23 | 0.22 | 0.21 | 0.39 | 0.32 | 0.42 | 0.35 | 0.23 | 0.24 |
| Yb | 2.15 | 2.26 | 1.98 | 1.54 | 1.57 | 1.52 | 2.54 | 2.14 | 2.66 | 2.35 | 1.56 | 1.57 |
| Lu | 0.33 | 0.34 | 0.30 | 0.25 | 0.25 | 0.25 | 0.38 | 0.33 | 0.40 | 0.35 | 0.27 | 0.26 |
| Ga | 18.6 | 16.7 | 18.2 | 15.8 | 15.4 | 16.7 | 19.6 | 18.5 | 20.3 | 19.8 | 19.1 | 18.3 |
| Cs | 1.56 | 1.35 | 1.78 | 1.27 | 1.09 | 1.32 | 1.45 | 0.94 | 1.56 | 1.64 | 2.81 | 2.56 |
| Rb | 218 | 225 | 224 | 185 | 183 | 189 | 245 | 206 | 236 | 240 | 219 | 214 |
| Sr | 19.3 | 18.7 | 25.0 | 30.3 | 30.7 | 29.0 | 16.0 | 23.4 | 21.9 | 20.5 | 16.1 | 14.4 |
| Ba | 87.2 | 71.4 | 102 | 74.9 | 56.8 | 88.6 | 37.7 | 43.2 | 53.1 | 51.8 | 43.4 | 35.9 |
| Y | 20.4 | 21.2 | 18.5 | 10.9 | 11.4 | 11.5 | 26.3 | 18.8 | 25.5 | 23.1 | 14.2 | 13.5 |
| Zr | 129 | 123 | 108 | 100 | 103 | 102 | 139 | 131 | 125 | 123 | 129 | 102 |
| Hf | 5.20 | 5.20 | 4.60 | 4.10 | 4.00 | 4.00 | 5.60 | 5.70 | 5.50 | 5.30 | 5.40 | 4.60 |
| Nb | 30.2 | 30.1 | 27.5 | 22.2 | 21.4 | 21.7 | 32.2 | 34.9 | 39.0 | 36.5 | 20.9 | 19.1 |
| Ta | 2.60 | 2.50 | 2.30 | 2.00 | 1.80 | 1.90 | 2.70 | 3.10 | 3.30 | 3.00 | 2.60 | 2.50 |
| Th | 32.6 | 32.6 | 30.1 | 29.9 | 28.1 | 28.5 | 36.2 | 41.7 | 37.0 | 35.7 | 33.5 | 36.3 |
| U | 5.48 | 4.42 | 3.46 | 3.30 | 3.15 | 3.29 | 4.57 | 3.92 | 4.39 | 4.03 | 1.62 | 1.44 |
| Cr | 10.0 | 10.0 | 10.0 | 20.0 | 20.0 | 20.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| δEu | 0.18 | 0.20 | 0.18 | 0.32 | 0.42 | 0.33 | 0.10 | 0.11 | 0.13 | 0.13 | 0.23 | 0.26 |
| (La/Sm)N | 5.90 | 4.88 | 6.19 | 9.79 | 9.75 | 10.57 | 4.21 | 3.71 | 4.33 | 4.26 | 6.04 | 5.34 |
| (Gd/Lu)N | 1.24 | 0.83 | 1.26 | 0.61 | 0.69 | 0.55 | 1.47 | 1.34 | 1.12 | 1.19 | 1.20 | 1.15 |
| TZr(°C) | 736 | 730 | 718 | 707 | 707 | 708 | 735 | 729 | 718 | 720 | 729 | 707 |