Table 4-6 Zircon compositions of some early Paleozoic TTGs in the Yunkai domian

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sample | GD18-2 | GD18-2 | GD18-2 | GD18-2 | GD18-2 | Gdx03-3 | GDX03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 |
| spot | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| zircon type | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Met | Met | Mag | Met | Mag |
| Rock type | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn |
| La | 0.723 | 0.003 | 0.003 | 0.065 | 1.276 | 0.011 | 0.081 | 0.030 | 0.049 | 0.063 | 0.020 | 0.017 | 0.153 | 0.339 |
| Ce | 4.17 | 4.03 | 4.60 | 8.76 | 8.20 | 13.61 | 21.54 | 18.65 | 27.29 | 2.98 | 2.31 | 24.75 | 6.81 | 18.66 |
| Pr | 0.468 | 0.052 | 0.048 | 0.036 | 0.635 | 0.005 | 0.110 | 0.080 | 0.129 | 0.034 | 0.017 | 0.091 | 0.113 | 0.316 |
| Nd | 5.17 | 1.34 | 0.60 | 0.92 | 4.55 | 0.89 | 1.60 | 0.87 | 1.88 | 0.13 | 0.16 | 1.58 | 0.84 | 2.05 |
| Sm | 9.53 | 3.47 | 2.33 | 3.69 | 6.75 | 2.20 | 3.99 | 2.81 | 3.43 | 0.31 | 0.31 | 4.29 | 1.88 | 2.92 |
| Eu | 0.49 | 0.62 | 0.22 | 0.55 | 0.37 | 0.25 | 0.36 | 0.33 | 0.42 | 0.08 | 0.08 | 0.42 | 0.71 | 0.46 |
| Gd | 59.9 | 32.9 | 23.5 | 28.8 | 49.6 | 11.4 | 23.2 | 21.8 | 23.1 | 2.20 | 1.64 | 25.24 | 14.53 | 17.80 |
| Tb | 22.2 | 12.6 | 9.66 | 11.07 | 19.69 | 4.83 | 9.71 | 8.97 | 8.80 | 1.34 | 0.88 | 10.22 | 7.21 | 6.63 |
| Dy | 273 | 158 | 131 | 157 | 260 | 67 | 126 | 126 | 114 | 23 | 14 | 135 | 110 | 81 |
| Ho | 107 | 65.1 | 55.2 | 68.6 | 103.4 | 30.0 | 52.6 | 53.6 | 47.0 | 12.8 | 7.7 | 57.3 | 54.7 | 34.2 |
| Er | 471 | 295 | 265 | 335 | 474 | 157 | 266 | 274 | 229 | 79 | 51 | 286 | 307 | 162 |
| Tm | 96.0 | 61.7 | 58.4 | 71.8 | 97.9 | 37.0 | 60.8 | 63.1 | 51.8 | 22.2 | 14.7 | 63.9 | 80.7 | 36.0 |
| Yb | 852 | 563 | 539 | 680 | 872 | 393 | 583 | 610 | 499 | 262 | 187 | 634 | 890 | 350 |
| Lu | 166 | 113 | 109 | 139 | 170 | 85 | 124 | 124 | 104 | 65 | 52 | 129 | 197 | 70 |
| Y | 3095 | 1874 | 1681 | 1981 | 2939 | 949 | 1620 | 1677 | 1451 | 452 | 302 | 1773 | 1870 | 1034 |
| Nb | 0.97 | 1.19 | 1.60 | 4.27 | 0.87 | 6.85 | 2.86 | 3.44 | 3.21 | 10.26 | 1.28 | 4.66 | 32.0 | 2.16 |
| Ta | 0.44 | 0.60 | 1.04 | 1.61 | 0.49 | 6.37 | 2.78 | 2.99 | 2.35 | 11.89 | 1.93 | 2.65 | 33.5 | 1.48 |
| Hf | 11366 | 10113 | 10726 | 10381 | 12261 | 12728 | 11413 | 11814 | 11057 | 15230 | 15606 | 10363 | 17275 | 11237 |
| SiO2 | 35.66 | 36.02 | 37.55 | 34.27 | 33.71 | 35.19 | 34.45 | 34.86 | 34.91 | 34.89 | 35.55 | 34.32 | 35.28 | 35.49 |
| P | 1711 | 719 | 792 | 463 | 1580 | 257 | 514 | 662 | 397 | 171 | 67 | 486 | 403 | 270 |
| Ti | 10.39 | 6.43 | 4.29 | 5.13 | 5.38 | 3.04 | 1.78 | 2.23 | 2.48 | 0.34 | 1.39 | 2.68 | 0.64 | 0.95 |
| ZrO2 | 61.58 | 62.15 | 60.54 | 63.85 | 63.65 | 62.80 | 63.49 | 63.02 | 63.09 | 62.94 | 62.21 | 63.73 | 61.54 | 62.68 |
| Na | 155.26 | 0.24 | 17.11 | 0.84 | 14.57 | 35.72 | 9.49 | 42.47 | 48.77 | 0.45 | 8.63 | 3.62 | 6.37 | 9.79 |
| Mg | 33.40 | 0.00 | 1.95 | 0.38 | 0.00 | 4.97 | 0.46 | 2.81 | 3.84 | 0.00 | 0.77 | 1.51 | 6.15 | 0.92 |
| Al | 677 | 6.95 | 4.46 | 0.09 | 7.66 | 18.19 | 15.81 | 13.47 | 12.74 | 1.29 | 1.88 | 1.56 | 53.50 | 5.46 |
| K | 340 | 0.07 | 17.82 | 3.35 | 6.07 | 37.76 | 11.78 | 31.92 | 71.33 | 0.00 | 3.33 | 10.04 | 5.38 | 5.91 |
| Ca | 531 | 0.0 | 6.8 | 83.5 | 762.3 | 31.9 | 71.9 | 41.4 | 66.2 | 70.3 | 0.0 | 26.7 | 25.5 | 0.0 |
| Mn | 2.71 | 0.94 | 0.37 | 0.37 | 1.47 | 0.10 | 0.65 | 0.30 | 0.00 | 0.45 | 0.20 | 0.00 | 1.38 | 0.00 |
| Fe | 157 | 9.9 | 33.0 | 10.1 | 20.9 | 27.7 | 17.9 | 149.2 | 42.0 | 19.5 | 64.6 | 9.5 | 467 | 23.1 |
| Sc | 401 | 288 | 312 | 380 | 334 | 183 | 196 | 194 | 184 | 177 | 173 | 187 | 179 | 184 |
| Li | 5.74 | 2.45 | 7.83 | 1.28 | 4.79 | 37.17 | 37.11 | 27.06 | 35.04 | 39.28 | 67.72 | 20.47 | 91.34 | 38.36 |
| Be | 0.39 | 0.27 | 0.00 | 0.23 | 0.00 | 0.00 | 0.36 | 0.25 | 0.37 | 0.36 | 0.00 | 0.00 | 1.15 | 0.26 |
| Ba | 6.76 | 0.00 | 0.07 | 0.06 | 0.00 | 6.85 | 0.00 | 2.31 | 1.17 | 0.00 | 2.66 | 0.44 | 2.79 | 0.02 |
| Sr | 1.15 | 0.25 | 0.31 | 0.26 | 0.56 | 0.38 | 0.34 | 0.42 | 0.38 | 0.24 | 0.30 | 0.25 | 0.58 | 0.45 |
| Pb | 4.36 | 3.18 | 3.93 | 4.10 | 5.32 | 16.98 | 22.37 | 14.78 | 35.55 | 1.97 | 1.75 | 30.03 | 6.24 | 22.05 |
| Th | 103 | 76 | 98 | 107 | 126 | 411 | 578 | 390 | 822 | 68 | 75 | 760 | 248 | 492 |
| U | 175 | 141 | 260 | 234 | 279 | 1130 | 1019 | 719 | 1040 | 1448 | 2104 | 913 | 3989 | 966 |
| Th/U | 0.59 | 0.54 | 0.38 | 0.46 | 0.45 | 0.36 | 0.57 | 0.54 | 0.79 | 0.05 | 0.04 | 0.83 | 0.06 | 0.51 |
| ΣREE | 2067 | 1311 | 1199 | 1505 | 2069 | 802 | 1273 | 1304 | 1109 | 471 | 332 | 1373 | 1672 | 783 |
| δEu | 0.06 | 0.18 | 0.09 | 0.16 | 0.06 | 0.15 | 0.11 | 0.13 | 0.14 | 0.31 | 0.32 | 0.12 | 0.42 | 0.19 |
| δCe | 1.7 | 74.5 | 87.9 | 43.6 | 2.2 | 420.5 | 55.0 | 92.3 | 82.9 | 15.5 | 30.1 | 154.1 | 12.5 | 13.8 |
| TTi-zr/℃ | 819 | 770 | 731 | 748 | 752 | 701 | 657 | 675 | 684 | 543 | 638 | 690 | 583 | 610 |

Mag-Magmatic, Met-Metamorphic, HA-Hydrothermal alteration

Table 4-6(Continued).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sample | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx03-3 | Gdx10-1 | Gdx10-1 | Gdx10-1 | Gdx10-1 | Gdx10-1 | Gdx10-1 |
| spot | 10 | 1# | 2# | 3# | 4# | 5# | 6# | 7# | 1# | 2# | 3# | 4# | 5# | 6# |
| zircon type | Mag | Met | Met | Met | Met | Met | Met | Met | Mag | Mag | Mag | Mag | Mag | Mag |
| Rock type | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Hb-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn |
| La | 0.030 | 0.801 | 2.583 | 0.043 | 1.553 | 0.006 | 7.187 | 0.018 | 0.0056 | 3.00 | 0.0046 | 0.015 | 0.014 | 0.126 |
| Ce | 17.76 | 6.98 | 13.36 | 2.92 | 6.25 | 2.09 | 22.44 | 3.04 | 3.91 | 16.1 | 10.3 | 6.10 | 6.12 | 9.29 |
| Pr | 0.048 | 0.87 | 2.13 | 0.02 | 1.20 | 0.004 | 4.23 | 0.02 | 0.036 | 1.70 | 0.048 | 0.17 | 0.092 | 0.101 |
| Nd | 0.91 | 5.69 | 14.46 | 0.15 | 6.61 | 0.009 | 19.65 | 0.06 | 0.94 | 10.88 | 1.39 | 2.82 | 1.64 | 1.49 |
| Sm | 2.27 | 5.41 | 13.46 | 0.35 | 5.59 | 0.30 | 12.65 | 0.41 | 3.50 | 7.45 | 4.23 | 7.42 | 4.80 | 4.37 |
| Eu | 0.43 | 1.03 | 2.38 | 0.02 | 0.82 | 0.02 | 1.61 | 0.09 | 0.41 | 0.35 | 0.45 | 0.79 | 0.52 | 0.46 |
| Gd | 19.05 | 16.99 | 38.01 | 2.23 | 20.41 | 3.54 | 30.78 | 3.35 | 25.0 | 29.0 | 30.7 | 46.3 | 43.4 | 37.6 |
| Tb | 6.69 | 5.73 | 11.81 | 1.19 | 8.52 | 2.34 | 11.19 | 2.33 | 9.51 | 10.27 | 12.3 | 17.5 | 17.4 | 15.9 |
| Dy | 88 | 66.4 | 113.2 | 21.0 | 104.7 | 44.6 | 148.3 | 40.1 | 130 | 128 | 167 | 221 | 225 | 211 |
| Ho | 39.3 | 26.1 | 33.2 | 11.6 | 49.5 | 21.3 | 63.8 | 22.6 | 53.9 | 51.9 | 68.2 | 86.6 | 92.3 | 86.8 |
| Er | 199 | 139.6 | 154.0 | 79.0 | 285.7 | 123.6 | 353.3 | 143.9 | 255 | 243 | 325 | 375 | 427 | 403 |
| Tm | 44.7 | 36.3 | 40.5 | 23.6 | 74.8 | 33.2 | 93.6 | 40.5 | 55.6 | 51.5 | 71.8 | 76.2 | 89.3 | 84.6 |
| Yb | 439 | 405.4 | 477.8 | 304.1 | 845.8 | 344.1 | 1029.1 | 469.9 | 525 | 486 | 658 | 672 | 805 | 774 |
| Lu | 92 | 98.0 | 122.3 | 84.8 | 201.0 | 78.2 | 237.6 | 112.2 | 108 | 99.0 | 133 | 133 | 159 | 154 |
| Y | 1267 | 917 | 1208 | 463 | 1728 | 717 | 2087 | 828 | 1595 | 1514 | 2059 | 2404 | 2678 | 2484 |
| Nb | 2.64 | 10.97 | 5.46 | 5.53 | 44.26 | 18.25 | 40.26 | 22.81 | 1.24 | 1.64 | 3.22 | 0.89 | 1.41 | 3.65 |
| Ta | 1.54 | 14.8 | 11.7 | 7.1 | 53.6 | 19.0 | 33.7 | 31.6 | 0.68 | 1.10 | 1.78 | 0.62 | 0.83 | 1.82 |
| Hf | 11464 | 14100 | 16973 | 18927 | 21213 | 15268 | 15883 | 16792 | 9432 | 11528 | 11135 | 10425 | 11188 | 11020 |
| SiO2 | 35.20 | 32.73 | 32.73 | 32.73 | 32.73 | 32.73 | 32.73 | 32.73 | 32.7 | 32.7 | 32.7 | 32.7 | 32.7 | 32.7 |
| P | 397 | 260 | 432 | 158 | 482 | 292 | 591 | 301 | 763 | 2226 | 801 | 678 | 1239 | 1007 |
| Ti | 0.79 | 2.91 | 1.86 | 1.50 | 1.37 | 0.65 | 1.80 | 1.18 | 4.24 | 4.63 | 6.97 | 3.75 | 7.71 | 3.76 |
| ZrO2 | 62.87 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Na | 11.76 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mg | 1.93 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Al | 3.04 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| K | 0.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ca | 2.0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mn | 0.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fe | 12.2 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sc | 183 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Li | 35.48 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Be | 0.13 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ba | 0.19 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sr | 0.31 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pb | 24.45 | 111.3 | 111.8 | 86.6 | 167.7 | 49.1 | 199.4 | 75.5 | 17.59 | 28.31 | 41.9 | 23.56 | 22.60 | 48.6 |
| Th | 583 | 147 | 113 | 82.5 | 180 | 59.2 | 399 | 93.2 | 93.8 | 152 | 237 | 173 | 141 | 322 |
| U | 967 | 2848 | 2878 | 2244 | 4317 | 1245 | 5003 | 1975 | 207 | 337 | 490 | 271 | 273 | 583 |
| Th/U | 0.60 | 0.05 | 0.04 | 0.04 | 0.04 | 0.05 | 0.08 | 0.05 | 0.45 | 0.45 | 0.48 | 0.64 | 0.51 | 0.55 |
| ΣREE | 950 | 815 | 1039 | 531 | 1613 | 653 | 2035 | 838 | 1171 | 1138 | 1482 | 1646 | 1872 | 1783 |
| δEu | 0.20 | 0.33 | 0.32 | 0.06 | 0.23 | 0.06 | 0.25 | 0.23 | 0.13 | 0.07 | 0.12 | 0.13 | 0.11 | 0.11 |
| δCe | 113.6 | 2.0 | 1.4 | 23.4 | 1.1 | 101.1 | 1.0 | 39.7 | 66.6 | 1.7 | 168.7 | 29.4 | 41.4 | 19.9 |
| TTi-zr/℃ | 597 | 697 | 660 | 644 | 637 | 584 | 658 | 626 | 730 | 738 | 778 | 719 | 788 | 720 |

Mag-Magmatic, Met-Metamorphic, HA-Hydrothermal alteration

Table 4-6(Continued).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sample | Gdx10-1 | Gdx10-1 | Gdx10-1 | Gdx10-1 | GD16-1 | GD16-1 | GD16-1 | GD16-1 | GD16-1 | GD16-1 | GDX09 | GDX09 | GDX09 | GDX09 |
| spot | 7# | 8# | 9# | 10# | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 |
| zircon type | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag |
| Rock type | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Bi-Tn | Tr | Tr | Tr | Tr |
| La | 1.26 | 0.082 | 0.064 | 0.034 | 0.611 | 0.027 | 0.040 | 1.062 | 0.056 | 0.343 | 0.827 | 0.552 | 2.880 | 0.003 |
| Ce | 10.2 | 4.95 | 5.84 | 8.12 | 11.22 | 8.97 | 5.42 | 13.06 | 6.42 | 7.10 | 29.66 | 8.56 | 33.25 | 5.64 |
| Pr | 0.65 | 0.090 | 0.052 | 0.074 | 0.432 | 0.110 | 0.087 | 0.506 | 0.091 | 0.226 | 0.525 | 0.131 | 2.467 | 0.057 |
| Nd | 4.50 | 1.65 | 0.81 | 1.25 | 3.93 | 2.81 | 1.82 | 3.43 | 1.52 | 1.67 | 4.70 | 1.30 | 17.23 | 0.60 |
| Sm | 6.01 | 5.52 | 2.75 | 4.18 | 6.10 | 6.07 | 5.17 | 4.76 | 4.53 | 2.69 | 7.87 | 1.85 | 11.65 | 2.14 |
| Eu | 0.71 | 0.63 | 0.10 | 0.52 | 0.33 | 1.13 | 0.45 | 0.40 | 0.42 | 0.24 | 0.84 | 0.40 | 0.95 | 0.28 |
| Gd | 40.9 | 37.7 | 27.8 | 32.2 | 49.20 | 45.46 | 35.33 | 29.01 | 34.18 | 17.36 | 50.17 | 15.05 | 60.78 | 16.52 |
| Tb | 16.1 | 13.3 | 10.8 | 12.6 | 20.13 | 16.95 | 13.65 | 12.11 | 13.17 | 6.95 | 18.36 | 6.23 | 22.47 | 6.28 |
| Dy | 202 | 170 | 159 | 169 | 265 | 219 | 187 | 161 | 175 | 94 | 223 | 82 | 279 | 81 |
| Ho | 84.8 | 66.5 | 65.8 | 70.1 | 108.7 | 89.4 | 77.2 | 68.2 | 71.5 | 38.3 | 88.2 | 35.5 | 111.5 | 32.3 |
| Er | 396 | 296 | 318 | 321 | 505 | 406 | 360 | 319 | 334 | 187 | 390 | 164 | 507 | 152 |
| Tm | 83.1 | 60.0 | 73.2 | 68.5 | 105.8 | 84.8 | 77.5 | 67.2 | 68.7 | 39.9 | 80.0 | 35.3 | 103.2 | 31.8 |
| Yb | 770 | 541 | 672 | 624 | 941 | 759 | 715 | 605 | 629 | 367 | 712 | 327 | 906 | 304 |
| Lu | 154 | 108 | 138 | 123 | 187 | 151 | 146 | 123 | 128 | 75 | 137 | 68 | 176 | 63 |
| Y | 2452 | 1876 | 2003 | 2021 | 3059 | 2465 | 2177 | 1933 | 2043 | 1129 | 2475 | 1004 | 3163 | 950 |
| Nb | 3.02 | 0.74 | 1.94 | 2.26 | 2.59 | 2.38 | 1.43 | 2.18 | 1.45 | 0.96 | 6.06 | 1.76 | 10.90 | 1.14 |
| Ta | 1.15 | 0.48 | 1.55 | 1.24 | 1.71 | 1.02 | 0.73 | 1.28 | 0.88 | 0.64 | 2.45 | 0.70 | 7.36 | 0.57 |
| Hf | 9589 | 10660 | 11547 | 10497 | 11632 | 9906 | 11687 | 11707 | 11962 | 12090 | 10882 | 11350 | 11573 | 9913 |
| SiO2 | 32.7 | 32.7 | 32.7 | 32.7 | 34.84 | 34.79 | 34.86 | 34.77 | 34.70 | 35.08 | 34.89 | 35.02 | 35.18 | 34.85 |
| P | 1019 | 573 | 914 | 794 | 1845 | 465 | 840 | 1107 | 925 | 664 | 1001 | 242 | 1376 | 285 |
| Ti | 5.66 | 5.63 | 5.80 | 3.53 | 6.34 | 5.30 | 5.03 | 3.14 | 4.57 | 4.47 | 4.11 | 8.55 | 4.50 | 6.90 |
| ZrO2 |  |  |  |  | 62.34 | 63.30 | 62.98 | 62.94 | 63.13 | 62.95 | 62.77 | 63.20 | 62.14 | 63.64 |
| Na |  |  |  |  | 164 | 0.00 | 58.41 | 5.27 | 5.75 | 0.00 | 20.91 | 168.04 | 32.24 | 8.15 |
| Mg |  |  |  |  | 4.21 | 0.16 | 2.68 | 1.47 | 0.00 | 1.66 | 1.13 | 2.84 | 1.91 | 5.39 |
| Al |  |  |  |  | 285 | 0.09 | 6.10 | 5.01 | 10.02 | 1.33 | 46.97 | 289.53 | 35.49 | 1.85 |
| K |  |  |  |  | 123 | 0.00 | 51.5 | 0.69 | 5.25 | 0.00 | 28.22 | 126.52 | 30.04 | 4.86 |
| Ca |  |  |  |  | 848 | 113 | 16 | 835 | 136 | 513 | 979.6 | 101.2 | 859.4 | 0.0 |
| Mn |  |  |  |  | 10.63 | 0.00 | 0.00 | 6.45 | 1.20 | 2.15 | 2.53 | 0.94 | 4.68 | 0.04 |
| Fe |  |  |  |  | 32.3 | 0.0 | 25.8 | 20.0 | 10.5 | 0.0 | 27.9 | 27.0 | 117.9 | 10.4 |
| Sc |  |  |  |  | 330 | 329 | 342 | 277 | 280 | 239 | 272 | 222 | 247 | 246 |
| Li |  |  |  |  | 14.94 | 0.13 | 4.26 | 8.98 | 6.52 | 1.95 | 4.37 | 2.59 | 9.17 | 0.56 |
| Be |  |  |  |  | 0.00 | 0.14 | 0.14 | 0.00 | 0.00 | 0.14 | 0.26 | 0.00 | 0.41 | 0.12 |
| Ba |  |  |  |  | 1.73 | 0.00 | 0.00 | 0.02 | 0.10 | 0.00 | 0.62 | 10.51 | 0.78 | 1.30 |
| Sr |  |  |  |  | 0.77 | 0.25 | 0.45 | 0.57 | 0.29 | 0.31 | 0.48 | 0.29 | 0.78 | 0.25 |
| Pb | 28.22 | 17.38 | 34.11 | 32.8 | 12.42 | 6.26 | 6.70 | 9.79 | 5.14 | 3.60 | 16.68 | 2.93 | 18.63 | 2.32 |
| Th | 161 | 119 | 129 | 254 | 335 | 161 | 139 | 234 | 139 | 79 | 421 | 66 | 442 | 59 |
| U | 325 | 204 | 419 | 381 | 628 | 240 | 299 | 471 | 282 | 187 | 565 | 148 | 782 | 122 |
| Th/U | 0.50 | 0.58 | 0.31 | 0.67 | 0.53 | 0.67 | 0.46 | 0.50 | 0.49 | 0.42 | 0.75 | 0.44 | 0.57 | 0.49 |
| ΣREE | 1770 | 1304 | 1475 | 1434 | 2204 | 1791 | 1625 | 1408 | 1467 | 838 | 1744 | 745 | 2235 | 695 |
| δEu | 0.14 | 0.13 | 0.04 | 0.14 | 0.06 | 0.21 | 0.10 | 0.10 | 0.10 | 0.11 | 0.13 | 0.23 | 0.11 | 0.14 |
| δCe | 2.7 | 14.0 | 24.5 | 39.4 | 5.3 | 39.7 | 22.3 | 4.3 | 21.8 | 6.2 | 10.9 | 7.7 | 3.0 | 110.9 |
| TTi-zr/℃ | 757 | 757 | 760 | 714 | 768 | 751 | 746 | 704 | 737 | 735 | 727 | 798 | 736 | 777 |

Mag-Magmatic, Met-Metamorphic, HA-Hydrothermal alteration

Table 4-6(Continued).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sample | GDX09 | GDX09 | GDX09 | GDX09 | GDX09 | GDX09 | GDX09 | GDX09 | GDX09 | Gd11-4 | Gd11-4 | Gd11-4 | Gd11-4 | Gd11-4 |
| spot | 5 | 1# | 2.1# | 2.2# | 3# | 4# | 5# | 6# | 7# | 1# | 2# | 3# | 4# | 5# |
| zircon type | Mag | Mag | Mag | HA | HA | HA | HA | HA | HA | Mag | Mag | Mag | Met | Mag |
| Rock type | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Gd | Gd | Gd | Gd | Gd |
| La | 0.006 | 0.130 | 0.005 | 0.003 | 0.017 | 0.005 | 0.005 | 0.022 | 0.006 | 0.12 | 0.83 | 1.47 | 0.16 | 4.46 |
| Ce | 5.56 | 18.87 | 11.80 | 0.794 | 0.01 | 1.469 | 0.160 | 0.560 | 0.78 | 11.6 | 13.9 | 18.3 | 0.97 | 26.3 |
| Pr | 0.071 | 0.36 | 0.03 | 0.004 | 0.01 | 0.038 | 0.003 | 0.012 | 0.004 | 0.19 | 0.37 | 0.87 | 0.17 | 3.07 |
| Nd | 1.40 | 5.04 | 0.55 | 0.120 | 0.02 | 0.195 | 0.007 | 0.192 | 0.10 | 2.76 | 2.91 | 7.74 | 0.96 | 21.5 |
| Sm | 3.28 | 9.08 | 2.63 | 0.363 | 0.06 | 4.337 | 0.006 | 0.010 | 0.45 | 7.42 | 4.18 | 11.5 | 1.19 | 14.2 |
| Eu | 0.70 | 0.94 | 0.31 | 0.040 | 0.02 | 0.040 | 0.001 | 0.003 | 0.07 | 0.99 | 0.58 | 1.87 | 0.97 | 1.94 |
| Gd | 27.80 | 50.26 | 23.28 | 1.40 | 0.24 | 2.50 | 0.49 | 0.52 | 3.85 | 53.1 | 25.6 | 63.3 | 10.14 | 54.4 |
| Tb | 9.98 | 17.57 | 9.21 | 0.49 | 0.05 | 0.93 | 0.21 | 0.18 | 1.80 | 19.6 | 8.76 | 21.4 | 3.95 | 19.2 |
| Dy | 122 | 211.5 | 124.8 | 9.0 | 2.8 | 13.1 | 4.8 | 3.5 | 27.1 | 248 | 109 | 260 | 35.9 | 229 |
| Ho | 48.6 | 83.0 | 52.2 | 4.1 | 2.0 | 5.3 | 2.9 | 2.0 | 15.4 | 98 | 43.0 | 96.7 | 9.8 | 87.6 |
| Er | 219 | 364.1 | 244.1 | 22.5 | 19.4 | 27.8 | 23.6 | 16.3 | 98.8 | 427 | 201 | 413 | 29.4 | 396 |
| Tm | 43.8 | 72.1 | 50.0 | 5.7 | 7.3 | 6.4 | 7.3 | 6.0 | 28.4 | 89 | 42.2 | 84.6 | 5.26 | 84.9 |
| Yb | 402 | 633.9 | 449.1 | 58.5 | 100.2 | 70.4 | 88.1 | 90.0 | 298.1 | 802 | 398 | 750 | 41.6 | 786 |
| Lu | 80 | 125.5 | 92.6 | 14.0 | 28.0 | 16.4 | 20.5 | 27.2 | 62.8 | 158 | 80.9 | 144 | 7.21 | 158 |
| Y | 1388 | 2216 | 1425 | 118 | 77 | 155 | 107 | 71 | 500 | 2805 | 1298 | 2740 | 350 | 2599 |
| Nb | 0.86 | 3.50 | 4.13 | 1.10 | 2.16 | 0.79 | 1.51 | 1.19 | 2.12 | 3.40 | 1.95 | 3.32 | 4.52 | 29.7 |
| Ta | 0.43 | 5.92 | 1.87 | 1.28 | 1.76 | 0.53 | 2.06 | 1.15 | 1.87 | 2.07 | 1.24 | 1.56 | 1.23 | 20.5 |
| Hf | 10320 | 10975 | 12286 | 14625 | 14630 | 13449 | 14672 | 14286 | 15193 | 11758 | 9540 | 10247 | 18967 | 17146 |
| SiO2 | 34.69 | 32.73 | 32.73 | 32.73 | 32.73 | 32.73 | 32.73 | 32.73 | 32.73 | 32.7 | 32.7 | 32.7 | 32.7 | 32.7 |
| P | 313 | 351 | 376 | 34 | 94 | 59 | 48 | 61 | 27 | 541 | 588 | 913 | 52.6 | 540 |
| Ti | 4.09 | 4.55 | 1.63 | 0.13 | 0.45 | 0.57 | 0.77 | 0.61 | 1.56 | 2.73 | 6.60 | 4.32 | 1.14 | 7.20 |
| ZrO2 | 63.66 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Na | 10.12 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mg | 0.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Al | 0.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| K | 0.22 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ca | 75.2 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mn | 0.25 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fe | 0.0 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sc | 240 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Li | 1.96 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Be | 0.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ba | 0.58 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sr | 0.24 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pb | 2.54 | 40.4 | 35.8 | 1.6 | 0.6 | 14.5 | 1.5 | 1.1 | 7.0 | 81.9 | 21.61 | 54.0 | 79.36 | 313.5 |
| Th | 67 | 337.6 | 204.8 | 5.5 | 1.6 | 145.7 | 3.3 | 2.8 | 31.6 | 436 | 150 | 380 | 3.88 | 542 |
| U | 114 | 457.6 | 433.2 | 20.1 | 14 | 153.5 | 24 | 14 | 86 | 1002 | 248 | 614 | 2033 | 4142 |
| Th/U | 0.59 | 0.74 | 0.47 | 0.27 | 0.12 | 0.95 | 0.14 | 0.20 | 0.37 | 0.44 | 0.61 | 0.62 | 0.00 | 0.13 |
| ΣREE | 963 | 1592 | 1061 | 117 | 160 | 149 | 148 | 146 | 538 | 1917 | 930 | 1874 | 148 | 1885 |
| δEu | 0.22 | 0.13 | 0.12 | 0.17 | 0.42 | 0.04 | 0.07 | 0.14 | 0.17 | 0.15 | 0.17 | 0.21 | 0.85 | 0.21 |
| δCe | 64.4 | 21.2 | 237.6 | 51.1 | 0.1 | 26.5 | 9.4 | 8.3 | 39.1 | 18.2 | 6.1 | 3.9 | 1.4 | 1.7 |
| TTi-zr/℃ | 727 | 737 | 650 | 487 | 560 | 576 | 596 | 580 | 647 | 692 | 772 | 732 | 624 | 781 |

Mag-Magmatic, Met-Metamorphic, HA-Hydrothermal alteration

Table 4-6(Continued).

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sample | Gd11-4 | Gd11-4 | Gd11-4 | Gd11-4 | Gd11-4 | GD21-1 | GD21-1 | GD21-1 | GD21-1 | GD21-1 | GD21-1 |
| spot | 6# | 7# | 8# | 9# | 10# | 1 | 2 | 3 | 4 | 5 | 6 |
| zircon type | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag | Mag |
| Rock type | Gd | Gd | Gd | Gd | Gd | MG | MG | MG | MG | MG | MG |
| La | 0.33 | 0.28 | 0.014 | 3.16 | 0.0059 | 0.012 | 1.212 | 0.004 | 0.053 | 0.025 | 0.009 |
| Ce | 14.3 | 26.4 | 9.39 | 18.1 | 6.59 | 12.93 | 28.52 | 8.26 | 16.82 | 7.70 | 12.67 |
| Pr | 0.32 | 0.27 | 0.037 | 2.09 | 0.0088 | 0.050 | 0.771 | 0.065 | 0.046 | 0.051 | 0.145 |
| Nd | 4.66 | 3.24 | 0.91 | 10.88 | 0.39 | 0.96 | 6.47 | 1.83 | 1.36 | 1.36 | 2.97 |
| Sm | 9.74 | 8.18 | 4.15 | 7.97 | 1.86 | 3.93 | 11.30 | 4.83 | 5.03 | 5.67 | 7.04 |
| Eu | 1.62 | 1.17 | 0.37 | 1.49 | 0.24 | 0.44 | 1.96 | 0.74 | 0.66 | 1.18 | 1.50 |
| Gd | 59.6 | 62.4 | 39.8 | 35.6 | 25.3 | 31.57 | 68.41 | 36.80 | 36.35 | 35.44 | 44.98 |
| Tb | 20.4 | 24.1 | 17.7 | 12.3 | 11.3 | 13.37 | 24.15 | 16.23 | 14.47 | 13.24 | 16.07 |
| Dy | 244 | 289 | 228 | 140 | 154 | 193 | 305 | 223 | 188 | 165 | 208 |
| Ho | 90.0 | 107 | 85.8 | 55.3 | 62.4 | 81.8 | 115.2 | 96.4 | 77.4 | 64.4 | 81.9 |
| Er | 387 | 459 | 388 | 248 | 290 | 408 | 520 | 467 | 360 | 294 | 367 |
| Tm | 76.9 | 93.2 | 81.9 | 49.6 | 62.8 | 88.9 | 105.6 | 102.6 | 76.4 | 61.9 | 75.8 |
| Yb | 686 | 818 | 740 | 456 | 592 | 835 | 934 | 999 | 710 | 568 | 690 |
| Lu | 130 | 158 | 144 | 88.2 | 117 | 175 | 186 | 205 | 145 | 116 | 141 |
| Y | 2589 | 3105 | 2612 | 1612 | 1844 | 2365 | 3310 | 2800 | 2220 | 1841 | 2273 |
| Nb | 5.12 | 21.7 | 12.5 | 2.85 | 14.1 | 5.25 | 4.39 | 3.40 | 4.22 | 1.40 | 2.23 |
| Ta | 2.73 | 11.0 | 8.08 | 2.27 | 9.83 | 3.45 | 1.76 | 1.90 | 1.70 | 0.79 | 1.28 |
| Hf | 12043 | 13982 | 15511 | 11644 | 15478 | 13189 | 9697 | 12461 | 11149 | 11180 | 10755 |
| SiO2 | 32.7 | 32.7 | 32.7 | 32.7 | 32.7 | 34.57 | 34.94 | 34.45 | 34.87 | 34.64 | 34.81 |
| P | 427 | 781 | 743 | 719 | 476 | 973 | 2385 | 1494 | 930 | 970 | 941 |
| Ti | 4.55 | 2.00 | 1.07 | 6.8 | 1.66 | 4.04 | 8.13 | 2.86 | 1.48 | 8.62 | 7.55 |
| ZrO2 |  |  |  |  |  | 62.95 | 62.03 | 62.97 | 62.98 | 63.31 | 63.09 |
| Na |  |  |  |  |  | 1.62 | 71.17 | 0.04 | 29.81 | 8.85 | 2.28 |
| Mg |  |  |  |  |  | 0.44 | 3.03 | 0.82 | 1.00 | 0.81 | 0.00 |
| Al |  |  |  |  |  | 1.76 | 194.44 | 4.65 | 2.59 | 25.10 | 7.07 |
| K |  |  |  |  |  | 0.00 | 84.81 | 5.66 | 17.48 | 16.90 | 12.13 |
| Ca |  |  |  |  |  | 75.8 | 2796.3 | 0.0 | 0.0 | 17.7 | 0.0 |
| Mn |  |  |  |  |  | 0.80 | 16.15 | 0.00 | 0.00 | 0.00 | 0.43 |
| Fe |  |  |  |  |  | 13.8 | 85.7 | 8.3 | 3.9 | 0.0 | 29.8 |
| Sc |  |  |  |  |  | 414 | 486 | 591 | 443 | 468 | 464 |
| Li |  |  |  |  |  | 17.67 | 9.29 | 12.09 | 6.42 | 6.90 | 6.62 |
| Be |  |  |  |  |  | 0.06 | 0.13 | 0.13 | 0.00 | 0.00 | 0.25 |
| Ba |  |  |  |  |  | 0.00 | 1.19 | 0.00 | 0.00 | 0.10 | 0.00 |
| Sr |  |  |  |  |  | 0.42 | 0.95 | 0.38 | 2.11 | 0.23 | 0.30 |
| Pb | 84.2 | 227.3 | 155.5 | 46.77 | 150.1 | 9.46 | 20.32 | 5.27 | 9.43 | 4.86 | 7.13 |
| Th | 389 | 1028 | 516 | 183 | 284 | 248 | 498 | 133 | 222 | 119 | 183 |
| U | 1046 | 2801 | 2065 | 602 | 1949 | 614 | 504 | 406 | 340 | 171 | 254 |
| Th/U | 0.37 | 0.37 | 0.25 | 0.30 | 0.15 | 0.40 | 0.99 | 0.33 | 0.65 | 0.69 | 0.72 |
| ΣREE | 1725 | 2050 | 1741 | 1128 | 1324 | 1845 | 2309 | 2162 | 1632 | 1334 | 1650 |
| δEu | 0.20 | 0.16 | 0.09 | 0.27 | 0.11 | 0.12 | 0.21 | 0.17 | 0.15 | 0.25 | 0.26 |
| δCe | 10.7 | 23.2 | 100.6 | 1.7 | 221.0 | 125.4 | 7.1 | 126.1 | 82.9 | 51.8 | 85.3 |
| TTi-zr/℃ | 737 | 666 | 618 | 775 | 652 | 726 | 793 | 696 | 643 | 799 | 786 |

Mag-Magmatic, Met-Metamorphic, HA-Hydrothermal alteration