附表1 主量元素（%）、稀土元素（10-6）、微量元素（10-6）与Sr-Nd同位素分析结果

Appendix Table 1 Major elements(%), trace elements(10-6), and Sr-Nd isotopic compositions of ultramafic rocks from Yunkai

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 样品号 | 17SJ01-1 | 17SJ01-2 | 17SJ01-3 | 17SJ01-4 | 17SJ01-5 | 17SJ01-6 |
| 采样地 | 阳春三甲双井 | | | | | |
| 岩性 | 角闪石岩 | | | | | 辉石岩 |
| SiO2 | 35.92 | 42.68 | 38.77 | 34.14 | 39.24 | 49.44 |
| TiO2 | 3.72 | 1.48 | 3.33 | 2.74 | 1.24 | 0.75 |
| Al2O3 | 8.26 | 6.71 | 10.16 | 8.47 | 3.46 | 4.55 |
| Fe2O3 | 10.02 | 11.65 | 8.19 | 10.35 | 8.68 | 1.25 |
| FeO | 13.33 | 12.55 | 12.72 | 14.71 | 10.92 | 6.98 |
| MnO | 0.35 | 0.21 | 0.35 | 0.32 | 0.27 | 0.15 |
| MgO | 8.71 | 6.40 | 7.65 | 8.54 | 9.82 | 15.52 |
| CaO | 12.44 | 11.76 | 11.71 | 11.79 | 20.06 | 16.66 |
| Na2O | 1.14 | 1.03 | 1.36 | 1.03 | 0.49 | 0.46 |
| K2O | 1.02 | 0.86 | 1.77 | 1.89 | 0.06 | 1.72 |
| P2O5 | 1.94 | 2.01 | 0.68 | 2.33 | 3.07 | 0.12 |
| S | 1.28 | 0.34 | 1.15 | 1.84 | 0.77 | 0.01 |
| LOST | 1.40 | 1.05 | 1.59 | 1.79 | 1.22 | 1.26 |
| Total | 99.53 | 98.73 | 99.42 | 99.94 | 99.31 | 98.86 |
| FeOT | 22.35 | 23.03 | 20.09 | 24.02 | 18.73 | 8.10 |
| Fe2O3T | 24.83 | 25.60 | 22.33 | 26.70 | 20.81 | 9.01 |
| Mg# | 54 | 48 | 52 | 51 | 62 | 80 |
| La | 44.8 | 63.2 | 35.3 | 56.2 | 29 | 4.72 |
| Ce | 150 | 185 | 128 | 167 | 93.7 | 15.3 |
| Pr | 21.4 | 24.8 | 19.4 | 23 | 13.6 | 2.31 |
| Nd | 108 | 118 | 101 | 112 | 70.3 | 12 |
| Sm | 27.4 | 27.6 | 25.6 | 27.3 | 17.5 | 3.3 |
| Eu | 5.73 | 4.43 | 5.8 | 5.74 | 3.96 | 0.8 |
| Gd | 21.4 | 19.1 | 19.4 | 21.7 | 13.6 | 2.61 |
| Tb | 3.12 | 2.47 | 2.84 | 3.2 | 1.86 | 0.41 |
| Dy | 16.3 | 11 | 14.8 | 16.7 | 8.92 | 2.18 |
| Ho | 2.84 | 1.75 | 2.61 | 2.93 | 1.46 | 0.39 |
| Er | 6.78 | 3.95 | 6.19 | 6.95 | 3.26 | 0.94 |
| Tm | 0.9 | 0.47 | 0.83 | 0.92 | 0.4 | 0.14 |
| Yb | 5.34 | 2.66 | 4.92 | 5.46 | 2.4 | 0.81 |
| Lu | 0.66 | 0.32 | 0.62 | 0.69 | 0.32 | 0.11 |
| Sc | 73.4 | 96.3 | 50.5 | 73.1 | 88.4 | 61.1 |
| V | 598 | 644 | 520 | 635 | 558 | 217 |
| Cr | 86.4 | 18.2 | 262 | 34 | 98.2 | 1290 |
| Co | 65.8 | 60.5 | 80.3 | 68.4 | 83.5 | 51.7 |
| Ni | 32.8 | 12.5 | 77.1 | 21.6 | 41.2 | 138 |
| Cu | 158 | 244 | 200 | 154 | 198 | 130 |
| Zn | 192 | 208 | 203 | 212 | 99.5 | 85 |
| Ga | 20.1 | 33.1 | 22.6 | 23.3 | 10.1 | 7.56 |
| Rb | 10.8 | 19.7 | 35.2 | 54.1 | 2.06 | 103 |
| Sr | 367 | 112 | 331 | 342 | 243 | 106 |
| Y | 62.9 | 37.7 | 55.8 | 65.6 | 31.6 | 8.61 |
| Zr | 56.6 | 59.9 | 87.4 | 48.4 | 23.3 | 13.1 |
| Nb | 21.2 | 9.49 | 23.5 | 15 | 3.33 | 6.01 |
| Mo | 4.3 | 0.49 | 0.73 | 0.55 | 0.34 | 0.54 |
| Sn | 14.8 | 16.6 | 18.1 | 10.2 | 10.3 | 8.01 |
| Ba | 136 | 63.2 | 302 | 393 | 10.4 | 188 |
| Hf | 2.68 | 3.17 | 3.97 | 2.53 | 1.41 | 0.56 |
| Ta | 1.07 | 1.04 | 1.41 | 1.07 | 0.64 | 0.98 |
| Pb | 8.79 | 12.5 | 14.7 | 5.21 | 5.27 | 7.3 |
| Th | 1.52 | 9.98 | 0.96 | 2.94 | 2.02 | 0.57 |
| U | 0.48 | 2.87 | 0.54 | 0.95 | 0.42 | 0.21 |
| SI | 25.5 | 19.7 | 24.1 | 23.4 | 32.8 | 59.9 |
| AR | 1.23 | 1.23 | 1.33 | 1.34 | 1.05 | 1.23 |
| MF | 72.8 | 79.1 | 73.2 | 74.6 | 66.6 | 34.7 |
| ∑REE | 414.67 | 464.75 | 367.31 | 449.79 | 260.28 | 46.02 |
| (La/Yb)n | 6.02 | 17.04 | 5.15 | 7.38 | 8.67 | 4.18 |
| La/Sm | 1.64 | 2.29 | 1.38 | 2.06 | 1.66 | 1.43 |
| 87Sr/86Sr | 0.7103 | 0.72848 | 0.71018 | 0.71158 | 0.70804 | 0.71734 |
| 143Nd/144Nd | 0.512222 | 0.512043 | 0.512309 | 0.5122 | 0.512307 | 0.512352 |
| 87Rb/86Sr | 0.085 | 0.510 | 0.308 | 0.458 | 0.025 | 2.814 |
| 147Sm/144Nd | 0.1534 | 0.1414 | 0.1532 | 0.1473 | 0.1505 | 0.1662 |
| **εNd(t)** | -6.74 | -9.85 | -5.03 | -6.97 | -4.98 | -4.61 |
| Isr | 0.709997 | 0.726667 | 0.709086 | 0.709952 | 0.707953 | 0.707333 |

续上表

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 样品号 | 17SJ01-7 | 17SJ01-8 | 15DJ13-1 | 15DJ13-2 | 15DJ13-10 | 15DJ13-20 | 15DJ13-30 |
| 采样地 | 阳春三甲双井 | | 高州大井上平 | | | | |
| 岩性 | 辉石岩 | | 角闪岩 | | | | |
| SiO2 | 47.78 | 48.67 | 37.63 | 37.37 | 41.23 | 39.77 | 43.42 |
| TiO2 | 0.88 | 0.75 | 2.87 | 2.86 | 1.88 | 2.63 | 1.90 |
| Al2O3 | 5.18 | 5.12 | 7.50 | 7.47 | 8.04 | 10.50 | 6.41 |
| Fe2O3 | 2.04 | 1.10 | 8.98 | 9.72 | 4.15 | 4.81 | 5.30 |
| FeO | 7.55 | 5.68 | 13.60 | 13.45 | 14.20 | 14.80 | 12.20 |
| MnO | 0.16 | 0.10 | 0.26 | 0.26 | 0.28 | 0.26 | 0.24 |
| MgO | 15.70 | 17.05 | 6.99 | 6.90 | 7.01 | 6.90 | 7.50 |
| CaO | 14.90 | 16.07 | 14.59 | 14.50 | 15.70 | 12.20 | 15.96 |
| Na2O | 0.39 | 0.33 | 1.11 | 1.11 | 0.96 | 1.54 | 0.94 |
| K2O | 2.21 | 2.44 | 0.97 | 0.98 | 1.50 | 1.56 | 0.88 |
| P2O5 | 0.08 | 0.19 | 2.79 | 2.76 | 2.52 | 2.14 | 2.74 |
| S | 0.42 | 0.01 |  |  |  |  |  |
| H2O+ |  |  | 1.87 | 1.71 | 1.80 | 2.63 | 1.68 |
| CO2 |  |  | 0.26 | 0.26 | 0.50 | 0.02 | 0.15 |
| LOST | 2.10 | 1.44 | 0.97 | 0.90 | 0.73 | 1.03 | 1.34 |
| Total | 99.38 | 98.94 | 100.41 | 100.26 | 100.51 | 100.78 | 100.66 |
| FeOT | 9.39 | 6.67 | 21.68 | 22.19 | 17.93 | 19.13 | 16.97 |
| Fe2O3T | 10.43 | 7.41 | 24.09 | 24.66 | 19.93 | 21.25 | 18.86 |
| Mg# | 79 | 84 | 48 | 48 | 47 | 45 | 52 |
| La | 2.73 | 4.3 | 34.4 | 34.6 | 35.8 | 30.7 | 23.5 |
| Ce | 10.3 | 13.7 | 95.6 | 95.0 | 97.0 | 75.3 | 60.1 |
| Pr | 1.71 | 2.09 | 13.4 | 13.4 | 14.1 | 12.3 | 9.34 |
| Nd | 9.44 | 11 | 65.5 | 65.4 | 68.2 | 61.0 | 46.6 |
| Sm | 2.86 | 2.93 | 15.9 | 15.9 | 16.7 | 15.3 | 11.1 |
| Eu | 0.7 | 0.73 | 3.63 | 3.56 | 3.96 | 3.83 | 2.64 |
| Gd | 2.24 | 2.18 | 14.2 | 14.3 | 14.5 | 13.5 | 9.88 |
| Tb | 0.36 | 0.31 | 1.76 | 1.75 | 1.86 | 1.80 | 1.26 |
| Dy | 2.05 | 1.43 | 8.91 | 8.98 | 9.84 | 9.38 | 6.61 |
| Ho | 0.37 | 0.23 | 1.53 | 1.56 | 1.68 | 1.57 | 1.11 |
| Er | 0.89 | 0.51 | 3.74 | 3.97 | 4.24 | 3.83 | 2.72 |
| Tm | 0.13 | 0.067 | 0.46 | 0.46 | 0.53 | 0.49 | 0.34 |
| Yb | 0.79 | 0.39 | 2.62 | 2.57 | 3.17 | 2.75 | 2.06 |
| Lu | 0.099 | 0.055 | 0.35 | 0.37 | 0.43 | 0.37 | 0.27 |
| Sc | 71.5 | 60.1 | 62.1 | 63.3 | 62.4 | 61.3 | 64.2 |
| V | 272 | 157 | 556 | 566 | 588 | 479 | 615 |
| Cr | 140 | 1630 | 117 | 123 | 93.4 | 131 | 164 |
| Co | 82.3 | 58.8 | 52.4 | 55.3 | 52.0 | 44.1 | 68.6 |
| Ni | 84.1 | 136 | 21.4 | 22.3 | 16.8 | 21.5 | 41.1 |
| Cu | 358 | 81 | 58.6 | 59.1 | 42.6 | 34.8 | 162 |
| Zn | 61 | 35.8 | 161 | 162 | 151 | 164 | 120 |
| Ga | 8.7 | 7.93 | 20.9 | 21.2 | 17.8 | 20.7 | 16.4 |
| Rb | 150 | 159 | 12.4 | 12.8 | 34.3 | 31.3 | 11.7 |
| Sr | 79.2 | 123 | 338 | 348 | 320 | 354 | 230 |
| Y | 7.98 | 5.07 | 39.6 | 40.6 | 44.6 | 41.2 | 29.0 |
| Zr | 8.08 | 8.01 | 61.5 | 67.3 | 94.8 | 52.3 | 40.7 |
| Nb | 4.07 | 3.67 | 6.64 | 6.68 | 6.38 | 7.47 | 3.99 |
| Mo | 0.21 | 0.46 | 0.58 | 0.51 | 0.67 | 1.39 | 0.75 |
| Sn | 5.65 | 3.74 | 3.04 | 3.17 | 2.62 | 2.92 | 3.63 |
| Ba | 258 | 246 | 127 | 129 | 192 | 291 | 88.5 |
| Hf | 0.4 | 0.38 | 2.42 | 2.59 | 3.12 | 2.11 | 1.68 |
| Ta | 0.66 | 0.74 | 0.37 | 0.38 | 0.35 | 0.36 | 0.25 |
| Pb | 4.12 | 3.25 | 5.27 | 5.31 | 5.65 | 6.88 | 5.24 |
| Th | 0.21 | 0.37 | 3.83 | 3.56 | 4.05 | 2.61 | 2.60 |
| U | 0.075 | 0.15 | 0.89 | 0.90 | 1.36 | 0.83 | 1.11 |
| SI | 56.3 | 64.1 | 22.1 | 21.4 | 25.2 | 23.3 | 28.0 |
| AR | 1.30 | 1.30 | 1.21 | 1.21 | 1.23 | 1.32 | 1.18 |
| MF | 37.9 | 28.5 | 76.3 | 77.1 | 72.3 | 74.0 | 70.0 |
| ∑REE | 34.67 | 39.92 | 262.06 | 261.81 | 272.08 | 232.15 | 177.55 |
| (La/Yb)n | 2.48 | 7.91 | 9.42 | 9.64 | 8.10 | 8.02 | 8.20 |
| La/Sm | 0.95 | 1.47 | 2.17 | 2.17 | 2.15 | 2.01 | 2.13 |
| 87Sr/86Sr | 0.72734 | 0.71476 |  |  | 0.709 | 0.70898 | 0.70859 |
| 143Nd/144Nd | 0.512194 | 0.512403 |  |  | 0.512281 | 0.512281 | 0.512318 |
| 87Rb/86Sr | 5.490 | 3.743 |  |  | 0.310 | 0.256 | 0.147 |
| 147Sm/144Nd | 0.1831 | 0.1610 |  |  | 0.1480 | 0.1516 | 0.1435 |
| **εNd(t)** | -8.23 | -3.45 |  |  | -5.41 | -5.53 | -4.55 |
| Isr | 0.707815 | 0.701450 |  |  | 0.707898 | 0.708071 | 0.708067 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 样品号 | 15SD25-1 | 15SD25-2 | 15SD25-21 | 15SD25-22 | 15SD25-23 |
| 采样地 | 高州东岸上垌 | | | | |
| 岩性 | 石榴斜长角闪岩 | | | | |
| SiO2 | 41.71 | 42.19 | 37.42 | 48.27 | 36.44 |
| TiO2 | 1.20 | 1.09 | 2.81 | 0.56 | 2.36 |
| Al2O3 | 17.73 | 18.31 | 8.01 | 17.86 | 5.68 |
| Fe2O3 | 4.69 | 5.35 | 8.17 | 2.01 | 12.96 |
| FeO | 10.70 | 9.60 | 9.77 | 8.22 | 12.04 |
| MnO | 0.30 | 0.27 | 0.22 | 0.17 | 0.21 |
| MgO | 7.22 | 6.94 | 8.72 | 7.49 | 8.74 |
| CaO | 10.44 | 10.15 | 15.89 | 10.81 | 14.63 |
| Na2O | 1.60 | 1.76 | 1.07 | 1.52 | 0.69 |
| K2O | 1.22 | 1.35 | 0.82 | 1.09 | 0.61 |
| P2O5 | 0.20 | 0.23 | 4.16 | 0.09 | 3.07 |
| S |  |  | 0.43 | 0.40 | 0.01 |
| H2O+ | 2.38 | 2.52 |  |  |  |
| CO2 | 0.14 | 0.08 |  |  |  |
| LOST | 1.59 | 1.50 | 1.63 | 0.86 | 0.96 |
| Total | 101.13 | 101.34 | 99.13 | 99.35 | 98.41 |
| FeOT | 14.92 | 14.41 | 17.12 | 10.03 | 23.70 |
| Fe2O3T | 16.58 | 16.02 | 19.03 | 11.14 | 26.34 |
| Mg# | 55 | 56 | 61 | 62 | 56 |
| La | 9.10 | 8.78 | 22.2 | 8.46 | 28.2 |
| Ce | 19.6 | 18.8 | 65.8 | 20.5 | 66.8 |
| Pr | 3.24 | 3.16 | 9.58 | 2.59 | 11.5 |
| Nd | 17.3 | 16.5 | 49.2 | 11.8 | 62.6 |
| Sm | 5.80 | 5.74 | 12.8 | 3.29 | 16.6 |
| Eu | 1.67 | 1.63 | 3.32 | 0.77 | 4.41 |
| Gd | 7.36 | 6.83 | 10.5 | 3.28 | 15 |
| Tb | 1.28 | 1.23 | 1.53 | 0.65 | 2.16 |
| Dy | 8.42 | 7.78 | 8.2 | 4.36 | 11.5 |
| Ho | 1.69 | 1.54 | 1.51 | 0.91 | 2.13 |
| Er | 4.76 | 4.22 | 3.64 | 2.5 | 5.12 |
| Tm | 0.67 | 0.64 | 0.5 | 0.4 | 0.69 |
| Yb | 4.13 | 3.92 | 2.91 | 2.69 | 4.01 |
| Lu | 0.57 | 0.55 | 0.38 | 0.37 | 0.54 |
| Sc | 46.7 | 43.8 | 78.2 | 35.7 | 85.9 |
| V | 387 | 357 | 542 | 201 | 898 |
| Cr | 188 | 141 | 56.6 | 54 | 54.8 |
| Co | 54.6 | 45.0 | 50.3 | 53.9 | 73.8 |
| Ni | 38.3 | 27.1 | 26.6 | 41.5 | 30.8 |
| Cu | 83.3 | 47.0 | 100 | 107 | 137 |
| Zn | 104 | 97.3 | 111 | 75.8 | 157 |
| Ga | 17.9 | 17.5 | 14.8 | 15.6 | 12.9 |
| Rb | 32.0 | 40.7 | 14.4 | 45.8 | 10.9 |
| Sr | 363 | 346 | 370 | 296 | 233 |
| Y | 45.8 | 42.5 | 33.1 | 21.9 | 58.1 |
| Zr | 32.6 | 37.8 | 35.3 | 48.2 | 35.2 |
| Nb | 3.76 | 3.44 | 6.94 | 5.23 | 3.74 |
| Mo | 7.75 | 0.37 | 0.96 | 0.74 | 0.9 |
| Sn | 1.96 | 1.71 | 2.38 | 1.95 | 2.22 |
| Ba | 82.5 | 95.4 | 127 | 88.4 | 101 |
| Hf | 1.20 | 1.29 | 1.66 | 1.63 | 1.42 |
| Ta | 0.20 | 0.18 | 0.45 | 0.37 | 0.2 |
| Pb | 4.51 | 4.24 | 4.13 | 5.33 | 3.89 |
| Th | 2.23 | 1.93 | 1.32 | 2.08 | 2.04 |
| U | 0.26 | 0.29 | 0.44 | 0.29 | 0.56 |
| SI | 28.4 | 27.8 | 30.5 | 36.8 | 24.9 |
| AR | 1.22 | 1.25 | 1.17 | 1.20 | 1.14 |
| MF | 68.1 | 68.3 | 67.3 | 57.7 | 74.1 |
| ∑REE | 85.58 | 81.29 | 192.07 | 62.57 | 231.26 |
| (La/Yb)n | 1.58 | 1.60 | 5.47 | 2.26 | 5.04 |
| La/Sm | 1.57 | 1.53 | 1.73 | 2.57 | 1.70 |
| 87Sr/86Sr | 0.70962 | 0.70983 | 0.70779 | 0.71184 | 0.70752 |
| 143Nd/144Nd | 0.512342 | 0.51234 | 0.51231 | 0.512164 | 0.51233 |
| 87Rb/86Sr | 0.255 | 0.340 | 0.113 | 0.448 | 0.135 |
| 147Sm/144Nd | 0.2034 | 0.2107 | 0.1573 | 0.1685 | 0.1603 |
| **εNd(t)** | -5.99 | -6.26 | -5.14 | -8.35 | -4.85 |
| Isr | 0.708712 | 0.708620 | 0.707390 | 0.710247 | 0.707039 |

注：Mg# = 100×Mg/(Mg+Fe2+).

附表2 锆石U-Pb-O同位素测试结果

Appendix table 2 Zircon U-Pb-O isotopic data of ultramafic rocks from Yunkai.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **分析点号** | **Th**  **/10-6** | **U**  **/10-6** | **Th/U** | **同位素比值** | | | | | |  | **同位素年龄/Ma** | | | | | | **谐和度** |  |  |
| **207Pb/**  **206Pb** | **1σ** | **207Pb/**  **235U** | **1σ** | **206Pb/**  **238U** | **1σ** |  | **207Pb/**  **206Pb** | **1σ** | **207Pb/**  **235U** | **1σ** | **206Pb/**  **238U** | **1σ** | **δ18O** | **1σ** |
| **15SD25-1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15SD25-1-25 | 54.6 | 240 | 0.23 | 0.0500 | 0.0034 | 0.2846 | 0.0162 | 0.0421 | 0.0007 |  | 195 | 159 | 254 | 12.8 | 266 | 4.5 | 95% |  |  |
| 15SD25-1-27 | 0.24 | 34.3 | 0.01 | 0.0666 | 0.0143 | 0.2780 | 0.0397 | 0.0382 | 0.0018 |  | 833 | 460 | 249 | 31.6 | 241 | 11.1 | 96% |  |  |
| 15SD25-1-28 | 75.2 | 581 | 0.13 | 0.0525 | 0.0043 | 0.2932 | 0.0221 | 0.0410 | 0.0005 |  | 309 | 182 | 261 | 17.3 | 259 | 3.0 | 99% |  |  |
| 15SD25-1-30 | 38.7 | 242 | 0.16 | 0.0546 | 0.0037 | 0.2785 | 0.0171 | 0.0381 | 0.0007 |  | 394 | 154 | 249 | 13.6 | 241 | 4.0 | 96% |  |  |
| 15SD25-1-31 | 0.23 | 34.6 | 0.01 | 0.0718 | 0.0154 | 0.2999 | 0.0400 | 0.0411 | 0.0018 |  | 981 | 444 | 266 | 31.3 | 260 | 11.0 | 97% |  |  |
| 15SD25-1-33 | 76.1 | 300 | 0.25 | 0.0533 | 0.0036 | 0.2852 | 0.0165 | 0.0401 | 0.0007 |  | 343 | 156 | 255 | 13.1 | 253 | 4.3 | 99% |  |  |
| 15SD25-1-34 | 184 | 694 | 0.27 | 0.0505 | 0.0023 | 0.2811 | 0.0123 | 0.0405 | 0.0005 |  | 217 | 103.7 | 252 | 9.8 | 256 | 3.0 | 98% |  |  |
| 15SD25-1-35 | 166 | 321 | 0.52 | 0.0517 | 0.0032 | 0.2675 | 0.0149 | 0.0380 | 0.0006 |  | 272 | 143 | 241 | 11.9 | 240 | 3.9 | 99% |  |  |
| 15SD25-1-36 | 1.11 | 118 | 0.01 | 0.0504 | 0.0061 | 0.2576 | 0.0309 | 0.0377 | 0.0011 |  | 213 | 259 | 233 | 25.0 | 239 | 6.6 | 97% |  |  |
| 15SD25-1-37 | 34.8 | 252 | 0.14 | 0.0565 | 0.0038 | 0.3119 | 0.0199 | 0.0408 | 0.0007 |  | 478 | 148 | 276 | 15.4 | 258 | 4.3 | 93% |  |  |
| 15SD25-1-38 | 65.5 | 273 | 0.24 | 0.0523 | 0.0036 | 0.2710 | 0.0168 | 0.0384 | 0.0006 |  | 298 | 125 | 243 | 13.5 | 243 | 3.8 | 99% |  |  |
| 15SD25-1-39 | 205 | 618 | 0.33 | 0.0518 | 0.0025 | 0.2913 | 0.0129 | 0.0411 | 0.0005 |  | 276 | 109 | 260 | 10.1 | 260 | 3.0 | 99% |  |  |
| 15SD25-1-40 | 1.00 | 25.8 | 0.04 | 0.0680 | 0.0167 | 0.2330 | 0.0326 | 0.0334 | 0.0016 |  | 878 | 530 | 213 | 26.9 | 212 | 10.2 | 99% |  |  |
| 15SD25-1-41 | 8.74 | 57.7 | 0.15 | 0.0628 | 0.0094 | 0.3093 | 0.0432 | 0.0413 | 0.0014 |  | 702 | 323 | 274 | 33.5 | 261 | 8.5 | 95% |  |  |
| 15SD25-1-42 | 1.90 | 91.3 | 0.02 | 0.0551 | 0.0060 | 0.2655 | 0.0247 | 0.0375 | 0.0009 |  | 417 | 251 | 239 | 19.8 | 237 | 5.8 | 99% |  |  |
| 15SD25-1-43 | 54.4 | 284 | 0.19 | 0.0550 | 0.0039 | 0.3006 | 0.0177 | 0.0411 | 0.0007 |  | 413 | 155 | 267 | 13.8 | 260 | 4.4 | 97% |  |  |
| 15SD25-1-44 | 1.34 | 25.7 | 0.05 | 0.0934 | 0.0281 | 0.3218 | 0.0812 | 0.0395 | 0.0019 |  | 1498 | 601 | 283 | 62.4 | 250 | 11.7 | 87% |  |  |
| 15SD25-1-45 | 61.3 | 691 | 0.09 | 0.0524 | 0.0023 | 0.2962 | 0.0124 | 0.0411 | 0.0005 |  | 302 | 93.5 | 263 | 9.7 | 260 | 3.0 | 98% |  |  |
| 15SD25-1-46 | 2.36 | 90.2 | 0.03 | 0.0588 | 0.0088 | 0.2714 | 0.0258 | 0.0379 | 0.0011 |  | 567 | 330 | 244 | 20.6 | 240 | 6.9 | 98% |  |  |
| 15SD25-1-47 | 0.48 | 98.8 | 0.00 | 0.0586 | 0.0058 | 0.3053 | 0.0249 | 0.0391 | 0.0012 |  | 554 | 223 | 271 | 19.4 | 248 | 7.2 | 91% |  |  |
| 15SD25-1-48 | 350 | 497 | 0.70 | 0.0568 | 0.0032 | 0.3222 | 0.0172 | 0.0415 | 0.0006 |  | 483 | 129 | 284 | 13.2 | 262 | 3.9 | 92% |  |  |
| **15DJ13** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15DJ13-1 | 91 | 168 | 0.56 | 0.0524 | 0.0025 | 0.276 | 0.014 | 0.03816 | 0.0007 |  | 304 | 110 |  |  | 241.4 | 4.2 |  | 9.32 | 0.22 |
| 15DJ13-2 | 575 | 537 | 1.11 | 0.0511 | 0.0011 | 0.2877 | 0.007 | 0.04086 | 0.0006 |  | 244 | 49 |  |  | 258.2 | 3.9 |  | 8.80 | 0.16 |
| 15DJ13-3 | 302 | 509 | 0.61 | 0.0508 | 0.0013 | 0.2794 | 0.008 | 0.03989 | 0.0006 |  | 232 | 58 |  |  | 252.1 | 3.9 |  | 9.00 | 0.20 |
| 15DJ13-4 | 184 | 348 | 0.55 | 0.0521 | 0.0016 | 0.2868 | 0.010 | 0.03996 | 0.0006 |  | 288 | 70 |  |  | 252.6 | 4 |  | 8.70 | 0.37 |
| 15DJ13-5 | 91 | 170 | 0.56 | 0.0516 | 0.0020 | 0.293 | 0.012 | 0.04115 | 0.0007 |  | 268 | 89 |  |  | 259.9 | 4.4 |  | 7.01 | 0.42 |
| 15DJ13-6 | 87 | 211 | 0.43 | 0.0515 | 0.0030 | 0.285 | 0.017 | 0.04007 | 0.0007 |  | 265 | 130 |  |  | 253.2 | 4.3 |  | 8.93 | 0.25 |
| 15DJ13-7 | 21 | 50 | 0.42 | 0.0523 | 0.0068 | 0.293 | 0.038 | 0.0406 | 0.0010 |  | 298 | 300 |  |  | 256.6 | 6.1 |  | 9.71 | 0.15 |
| 15DJ13-8 | 88 | 348 | 0.26 | 0.0516 | 0.0023 | 0.289 | 0.013 | 0.04062 | 0.0005 |  | 267 | 100 |  |  | 256.7 | 3.1 |  | 8.53 | 0.12 |
| 15DJ13-9 | 99 | 182 | 0.56 | 0.0506 | 0.0025 | 0.281 | 0.014 | 0.04022 | 0.0006 |  | 224 | 110 |  |  | 254.2 | 3.4 |  | 8.93 | 0.25 |
| 15DJ13-10 | 95 | 182 | 0.54 | 0.0501 | 0.0035 | 0.28 | 0.020 | 0.04046 | 0.0006 |  | 202 | 160 |  |  | 255.7 | 3.9 |  | 9.34 | 0.22 |
| 15DJ13-11 | 437 | 432 | 1.05 | 0.0513 | 0.0014 | 0.277 | 0.008 | 0.03916 | 0.0005 |  | 254 | 64 |  |  | 247.6 | 2.8 |  | 8.72 | 0.20 |
| 15DJ13-12 | 45 | 96 | 0.49 | 0.0513 | 0.0042 | 0.27 | 0.023 | 0.03821 | 0.0006 |  | 255 | 190 |  |  | 241.7 | 4.1 |  | 8.82 | 0.27 |
| **17SJ01-11** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17SJ01-11-01 | 1067 | 824 | 1.30 | 0.0496 | 0.0019 | 0.2773 | 0.0102 | 0.0410 | 0.0006 |  | 176 | 88.9 | 249 | 8.1 | 259 | 3.6 | 95% |  |  |
| 17SJ01-11-02 | 1033 | 686 | 1.51 | 0.0467 | 0.0020 | 0.2601 | 0.0112 | 0.0405 | 0.0006 |  | 35.3 | 165 | 235 | 9.0 | 256 | 3.5 | 91% |  |  |
| 17SJ01-11-03 | 720 | 563 | 1.28 | 0.0473 | 0.0021 | 0.2617 | 0.0113 | 0.0405 | 0.0006 |  | 64.9 | 104 | 236 | 9.1 | 256 | 3.6 | 91% |  |  |
| 17SJ01-11-04 | 1619 | 1193 | 1.36 | 0.0496 | 0.0019 | 0.2731 | 0.0104 | 0.0400 | 0.0005 |  | 176 | 90.7 | 245 | 8.3 | 253 | 3.3 | 96% |  |  |
| 17SJ01-11-05 | 1643 | 852 | 1.93 | 0.0481 | 0.0021 | 0.2651 | 0.0110 | 0.0402 | 0.0005 |  | 106 | 106 | 239 | 8.9 | 254 | 2.9 | 93% |  |  |
| 17SJ01-11-06 | 940 | 768 | 1.23 | 0.0534 | 0.0024 | 0.2950 | 0.0130 | 0.0399 | 0.0005 |  | 346 | 100.0 | 263 | 10.2 | 252 | 3.2 | 95% |  |  |
| 17SJ01-11-07 | 905 | 566 | 1.60 | 0.0518 | 0.0037 | 0.2832 | 0.0189 | 0.0402 | 0.0006 |  | 276 | 165 | 253 | 15.0 | 254 | 3.6 | 99% |  |  |
| 17SJ01-11-08 | 733 | 673 | 1.09 | 0.0473 | 0.0025 | 0.2631 | 0.0137 | 0.0404 | 0.0005 |  | 64.9 | 122 | 237 | 11.0 | 255 | 3.4 | 92% |  |  |
| 17SJ01-11-09 | 1079 | 1164 | 0.93 | 0.0494 | 0.0021 | 0.2755 | 0.0119 | 0.0402 | 0.0006 |  | 169 | 100.0 | 247 | 9.5 | 254 | 3.5 | 97% |  |  |
| 17SJ01-11-10 | 2019 | 1030 | 1.96 | 0.0464 | 0.0018 | 0.2564 | 0.0097 | 0.0401 | 0.0005 |  | 20.5 | 88.9 | 232 | 7.9 | 253 | 3.3 | 91% |  |  |
| 17SJ01-11-11 | 813 | 556 | 1.46 | 0.0488 | 0.0023 | 0.2698 | 0.0125 | 0.0404 | 0.0006 |  | 200 | 105 | 243 | 10.0 | 256 | 3.7 | 94% |  |  |
| 17SJ01-11-12 | 1584 | 876 | 1.81 | 0.0473 | 0.0020 | 0.2606 | 0.0106 | 0.0403 | 0.0005 |  | 61.2 | 100.0 | 235 | 8.5 | 255 | 3.1 | 92% |  |  |
| 17SJ01-11-13 | 1789 | 1863 | 0.96 | 0.0483 | 0.0016 | 0.2684 | 0.0088 | 0.0404 | 0.0005 |  | 122 | 79.6 | 241 | 7.1 | 256 | 3.0 | 94% |  |  |
| 17SJ01-11-14 | 790 | 680 | 1.16 | 0.0494 | 0.0025 | 0.2730 | 0.0133 | 0.0403 | 0.0006 |  | 165 | 119 | 245 | 10.6 | 255 | 3.6 | 96% |  |  |
| 17SJ01-11-15 | 2078 | 1272 | 1.63 | 0.0482 | 0.0019 | 0.2694 | 0.0105 | 0.0410 | 0.0006 |  | 109 | 93 | 242 | 8.4 | 259 | 3.6 | 93% |  |  |
| 17SJ01-11-16 | 1191 | 1271 | 0.94 | 0.0482 | 0.0019 | 0.2663 | 0.0109 | 0.0404 | 0.0007 |  | 106 | 94.4 | 240 | 8.8 | 255 | 4.2 | 93% |  |  |
| 17SJ01-11-17 | 896 | 763 | 1.17 | 0.0517 | 0.0022 | 0.2845 | 0.0121 | 0.0405 | 0.0006 |  | 272 | 96.3 | 254 | 9.5 | 256 | 3.9 | 99% |  |  |
| 17SJ01-11-18 | 1536 | 993 | 1.55 | 0.0474 | 0.0019 | 0.2627 | 0.0107 | 0.0405 | 0.0006 |  | 77.9 | 87.0 | 237 | 8.6 | 256 | 3.4 | 92% |  |  |
| 17SJ01-11-19 | 1153 | 680 | 1.70 | 0.0533 | 0.0023 | 0.2962 | 0.0131 | 0.0404 | 0.0006 |  | 343 | 100.0 | 263 | 10.3 | 255 | 3.6 | 96% |  |  |
| 17SJ01-11-20 | 851 | 536 | 1.59 | 0.0498 | 0.0025 | 0.2755 | 0.0130 | 0.0404 | 0.0006 |  | 183 | 119 | 247 | 10.4 | 255 | 3.6 | 96% |  |  |
| **17SJ01-12** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17SJ01-12-01 | 830 | 1235 | 0.67 | 0.0500 | 0.0025 | 0.2759 | 0.0147 | 0.0401 | 0.0005 |  | 198 | 117 | 247 | 11.7 | 254 | 3.3 | 97% |  |  |
| 17SJ01-12-02 | 386 | 991 | 0.39 | 0.0517 | 0.0029 | 0.2833 | 0.0160 | 0.0400 | 0.0005 |  | 272 | 97.2 | 253 | 12.6 | 253 | 3.3 | 99% |  |  |
| 17SJ01-12-03 | 198 | 469 | 0.42 | 0.0554 | 0.0038 | 0.3008 | 0.0182 | 0.0408 | 0.0007 |  | 428 | 119 | 267 | 14.2 | 258 | 4.3 | 96% |  |  |
| 17SJ01-12-04 | 557 | 1380 | 0.40 | 0.0594 | 0.0059 | 0.3318 | 0.0348 | 0.0404 | 0.0006 |  | 583 | 215 | 291 | 26.6 | 256 | 3.6 | 87% |  |  |
| 17SJ01-12-05 | 188 | 440 | 0.43 | 0.0467 | 0.0033 | 0.2592 | 0.0159 | 0.0407 | 0.0007 |  | 31.6 | 163 | 234 | 12.8 | 257 | 4.4 | 90% |  |  |
| 17SJ01-12-06 | 229 | 532 | 0.43 | 0.0632 | 0.0039 | 0.3450 | 0.0224 | 0.0398 | 0.0007 |  | 717 | 127 | 301 | 16.9 | 251 | 4.6 | 82% |  |  |
| 17SJ01-12-07 | 232 | 601 | 0.39 | 0.0507 | 0.0033 | 0.2723 | 0.0158 | 0.0402 | 0.0007 |  | 228 | 147 | 245 | 12.6 | 254 | 4.4 | 96% |  |  |
| 17SJ01-12-08 | 232 | 506 | 0.46 | 0.0509 | 0.0037 | 0.2779 | 0.0182 | 0.0408 | 0.0010 |  | 235 | 168 | 249 | 14.5 | 258 | 5.9 | 96% |  |  |
| 17SJ01-12-09 | 196 | 541 | 0.36 | 0.0536 | 0.0037 | 0.2744 | 0.0164 | 0.0393 | 0.0008 |  | 354 | 156 | 246 | 13.1 | 248 | 5.0 | 99% |  |  |
| 17SJ01-12-10 | 163 | 378 | 0.43 | 0.0505 | 0.0043 | 0.2599 | 0.0189 | 0.0392 | 0.0008 |  | 220 | 200 | 235 | 15.2 | 248 | 5.2 | 94% |  |  |
| 17SJ01-12-11 | 809 | 1869 | 0.43 | 0.0533 | 0.0020 | 0.2917 | 0.0111 | 0.0400 | 0.0007 |  | 343 | 87.0 | 260 | 8.7 | 253 | 4.2 | 97% |  |  |
| 17SJ01-12-12 | 811 | 1784 | 0.45 | 0.0496 | 0.0021 | 0.2752 | 0.0118 | 0.0402 | 0.0006 |  | 176 | 129 | 247 | 9.4 | 254 | 3.7 | 97% |  |  |
| 17SJ01-12-13 | 254 | 591 | 0.43 | 0.0513 | 0.0032 | 0.2789 | 0.0156 | 0.0402 | 0.0006 |  | 254 | 143 | 250 | 12.4 | 254 | 3.8 | 98% |  |  |
| 17SJ01-12-14 | 1970 | 2534 | 0.78 | 0.0515 | 0.0017 | 0.2847 | 0.0092 | 0.0401 | 0.0004 |  | 265 | 75.9 | 254 | 7.2 | 253 | 2.6 | 99% |  |  |
| 17SJ01-12-15 | 211 | 437 | 0.48 | 0.0515 | 0.0034 | 0.2801 | 0.0168 | 0.0406 | 0.0006 |  | 261 | 154 | 251 | 13.3 | 257 | 4.0 | 97% |  |  |
| 17SJ01-12-16 | 653 | 996 | 0.66 | 0.0517 | 0.0021 | 0.2866 | 0.0116 | 0.0403 | 0.0005 |  | 272 | 94.4 | 256 | 9.1 | 254 | 3.0 | 99% |  |  |
| 17SJ01-12-17 | 184 | 438 | 0.42 | 0.0511 | 0.0030 | 0.2771 | 0.0144 | 0.0393 | 0.0006 |  | 256 | 135.2 | 248 | 11.5 | 249 | 3.8 | 99% |  |  |
| 17SJ01-12-18 | 306 | 472 | 0.65 | 0.0518 | 0.0029 | 0.2789 | 0.0148 | 0.0392 | 0.0006 |  | 276 | 128 | 250 | 11.8 | 248 | 4.0 | 99% |  |  |
| 17SJ01-12-19 | 400 | 663 | 0.60 | 0.0510 | 0.0024 | 0.2820 | 0.0130 | 0.0405 | 0.0005 |  | 243 | 109 | 252 | 10.3 | 256 | 3.2 | 98% |  |  |
| 17SJ01-12-20 | 354 | 769 | 0.46 | 0.0544 | 0.0025 | 0.2933 | 0.0125 | 0.0394 | 0.0005 |  | 391 | 108 | 261 | 9.8 | 249 | 3.1 | 95% |  |  |

表3 锆石Lu-Hf同位素测试结果

Appendix table 3 Zircon Lu-Hf isotopic data of ultramafic rocks from Yunkai.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **176Yb/177Hf** | **** | **176Lu/177Hf** | **** | **176Hf/177Hf** | **** | **176Hf/177Hfi** | **eHf(0)** | **eHf(t)** | **TDM (Ma)** | **TDMC (Ma)** | **fLu/Hf** |
| 15DJ13-01 | 0.018665 | 0.000494 | 0.000770 | 0.000020 | 0.282443 | 0.000015 | 0.282440 | -11.6 | -6.5 | 1138 | 1684 | -0.98 |
| 15DJ13-02 | 0.022763 | 0.000313 | 0.000929 | 0.000012 | 0.282425 | 0.000018 | 0.282421 | -12.3 | -7.1 | 1167 | 1723 | -0.97 |
| 15DJ13-03 | 0.020571 | 0.000173 | 0.000862 | 0.000010 | 0.282476 | 0.000031 | 0.282472 | -10.5 | -5.4 | 1094 | 1612 | -0.97 |
| 15DJ13-04 | 0.030941 | 0.001469 | 0.001255 | 0.000056 | 0.282599 | 0.000072 | 0.282594 | -6.1 | -1.2 | 931 | 1341 | -0.96 |
| 15DJ13-05 | 0.022807 | 0.001130 | 0.000967 | 0.000049 | 0.282430 | 0.000017 | 0.282426 | -12.1 | -6.9 | 1162 | 1712 | -0.97 |
| 15DJ13-06 | 0.024703 | 0.000292 | 0.001019 | 0.000011 | 0.282435 | 0.000017 | 0.282430 | -11.9 | -6.7 | 1157 | 1701 | -0.97 |
| 15DJ13-07 | 0.018829 | 0.000615 | 0.000825 | 0.000027 | 0.282416 | 0.000020 | 0.282413 | -12.6 | -7.6 | 1177 | 1749 | -0.98 |
| 15DJ13-08 | 0.010406 | 0.000215 | 0.000471 | 0.000009 | 0.282400 | 0.000015 | 0.282398 | -13.1 | -8.0 | 1188 | 1778 | -0.99 |
| 15DJ13-09 | 0.020813 | 0.000319 | 0.000870 | 0.000014 | 0.282427 | 0.000019 | 0.282424 | -12.2 | -7.1 | 1162 | 1722 | -0.97 |
| 15DJ13-10 | 0.004264 | 0.000073 | 0.000190 | 0.000003 | 0.282351 | 0.000015 | 0.282350 | -14.9 | -9.5 | 1247 | 1881 | -0.99 |
| 15DJ13-11 | 0.029860 | 0.000918 | 0.001202 | 0.000037 | 0.282479 | 0.000017 | 0.282474 | -10.3 | -5.4 | 1099 | 1609 | -0.96 |
| 15DJ13-12 | 0.019404 | 0.000244 | 0.000839 | 0.000012 | 0.282398 | 0.000015 | 0.282394 | -13.2 | -8.0 | 1202 | 1782 | -0.97 |
| 15DJ13-13 | 0.034003 | 0.000820 | 0.001376 | 0.000033 | 0.282529 | 0.000019 | 0.282522 | -8.6 | -3.5 | 1035 | 1494 | -0.96 |
| 15DJ13-14 | 0.017338 | 0.000269 | 0.000692 | 0.000008 | 0.282453 | 0.000018 | 0.282450 | -11.3 | -6.2 | 1121 | 1663 | -0.98 |
| 15DJ13-15 | 0.010026 | 0.000283 | 0.000448 | 0.000014 | 0.282415 | 0.000017 | 0.282413 | -12.6 | -7.5 | 1167 | 1745 | -0.99 |
| 15DJ13-16 | 0.029483 | 0.000810 | 0.001180 | 0.000032 | 0.282475 | 0.000019 | 0.282470 | -10.5 | -5.5 | 1105 | 1617 | -0.96 |
| 15DJ13-17 | 0.010138 | 0.000307 | 0.000425 | 0.000013 | 0.282407 | 0.000017 | 0.282405 | -12.9 | -7.7 | 1177 | 1759 | -0.99 |
| 15DJ13-18 | 0.019668 | 0.000639 | 0.000811 | 0.000026 | 0.282422 | 0.000015 | 0.282418 | -12.4 | -7.3 | 1168 | 1733 | -0.98 |
| 15DJ13-19 | 0.024291 | 0.000523 | 0.001017 | 0.000019 | 0.282447 | 0.000017 | 0.282442 | -11.5 | -6.3 | 1140 | 1676 | -0.97 |
| 15DJ13-20 | 0.021469 | 0.000111 | 0.000880 | 0.000005 | 0.282441 | 0.000014 | 0.282436 | -11.7 | -6.4 | 1145 | 1686 | -0.97 |
| 15DJ13-21 | 0.019735 | 0.000366 | 0.000884 | 0.000016 | 0.282445 | 0.000020 | 0.282441 | -11.6 | -6.3 | 1138 | 1675 | -0.97 |
| 15DJ13-22 | 0.017260 | 0.000220 | 0.000721 | 0.000008 | 0.282430 | 0.000021 | 0.282427 | -12.1 | -6.9 | 1154 | 1711 | -0.98 |
| 15DJ13-23 | 0.018807 | 0.000299 | 0.000801 | 0.000009 | 0.282444 | 0.000017 | 0.282440 | -11.6 | -6.3 | 1137 | 1678 | -0.98 |
| 15DJ13-25 | 0.024794 | 0.000363 | 0.001040 | 0.000010 | 0.282475 | 0.000024 | 0.282470 | -10.5 | -5.3 | 1101 | 1612 | -0.97 |