Table 1 Trace element (ppm) results of the the quartz diorite porphyry in the Jiangshan Au deposit

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample No | | | Rb | K | | | Ba | | Th | | U | | Nb | | La | | Ce | | Sr | | Nd | | P | | Zr | | Hf | | Sm | Ti | | Y | Yb | | Lu |
| JS-H2 | | | 79.80 | 14936.17 | | | 1611.76 | | 8.42 | | 1.94 | | 8.10 | | 26.40 | | 45.40 | | 182.50 | | 14.80 | | 218.31 | | 120.00 | | 3.50 | | 2.33 | 1020.00 | | 6.10 | 0.54 | | 0.09 |
| JS-H3 | | | 87.90 | 17923.40 | | | 1074.51 | | 8.49 | | 4.11 | | 7.70 | | 25.00 | | 41.60 | | 527.00 | | 12.90 | | 218.31 | | 125.00 | | 3.60 | | 2.04 | 960.00 | | 5.50 | 0.51 | | 0.09 |
| JS-H4 | | | 81.10 | 16512.77 | | | 895.42 | | 7.87 | | 1.86 | | 7.00 | | 23.40 | | 40.30 | | 170.50 | | 13.60 | | 174.65 | | 119.00 | | 3.40 | | 2.06 | 960.00 | | 5.90 | 0.53 | | 0.08 |
| JS-H5 | | | 90.10 | 18587.23 | | | 1164.05 | | 8.46 | | 2.96 | | 8.10 | | 27.30 | | 48.10 | | 484.00 | | 17.20 | | 218.31 | | 127.00 | | 3.70 | | 2.90 | 1020.00 | | 5.80 | 0.55 | | 0.09 |
| JS-H6 | | | 96.10 | 19085.11 | | | 1701.31 | | 8.37 | | 1.72 | | 7.90 | | 28.40 | | 51.20 | | 460.00 | | 18.80 | | 218.31 | | 122.00 | | 3.40 | | 2.91 | 960.00 | | 6.00 | 0.55 | | 0.09 |
| JS-H7 | | | 81.30 | 16263.83 | | | 537.25 | | 7.28 | | 1.83 | | 7.00 | | 23.90 | | 40.80 | | 453.00 | | 14.30 | | 218.31 | | 112.00 | | 3.20 | | 2.37 | 900.00 | | 6.10 | 0.52 | | 0.08 |
| JS-H8 | | | 78.30 | 16512.77 | | | 1701.31 | | 6.69 | | 1.59 | | 6.60 | | 20.10 | | 34.60 | | 122.00 | | 12.00 | | 130.99 | | 100.00 | | 2.90 | | 2.02 | 840.00 | | 6.10 | 0.49 | | 0.08 |
| JS-H9 | | | 70.60 | 12861.70 | | | 537.25 | | 7.94 | | 1.68 | | 7.60 | | 24.40 | | 41.00 | | 374.00 | | 13.80 | | 218.31 | | 119.00 | | 3.60 | | 2.10 | 960.00 | | 5.90 | 0.50 | | 0.08 |
| JS-H10 | | | 63.00 | 11700.00 | | | 716.34 | | 7.30 | | 1.52 | | 6.70 | | 22.90 | | 39.50 | | 368.00 | | 13.20 | | 174.65 | | 106.00 | | 3.00 | | 2.36 | 900.00 | | 6.40 | 0.51 | | 0.08 |
| Sample No. V Ta Pr Eu Gd Tb Dy Ho Er Tm ΣREE LREE HREE LREE/HREE LaN/YbN *δ*Eu *δ*Ce | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| JS-H2 | 22.00 | | | 0.70 | 4.38 | | 0.65 | | 1.74 | | 0.22 | | 1.11 | | 0.22 | | 0.59 | | 0.09 | | 98.56 | | 93.96 | | 4.60 | | 20.43 | | | 35.07 | | | 0.95 | 0.94 | |
| JS-H3 | 6.00 | | | 0.70 | 3.87 | | 0.53 | | 1.34 | | 0.22 | | 1.08 | | 0.20 | | 0.53 | | 0.08 | | 89.99 | | 85.94 | | 4.05 | | 21.22 | | | 35.16 | | | 0.92 | 0.93 | |
| JS-H4 | 15.00 | | | 0.70 | 3.92 | | 0.52 | | 1.57 | | 0.22 | | 1.27 | | 0.20 | | 0.51 | | 0.08 | | 88.26 | | 83.80 | | 4.46 | | 18.79 | | | 31.67 | | | 0.85 | 0.94 | |
| JS-H5 | 22.00 | | | 0.70 | 4.82 | | 0.70 | | 1.88 | | 0.22 | | 1.17 | | 0.21 | | 0.58 | | 0.09 | | 105.81 | | 101.02 | | 4.79 | | 21.09 | | | 35.60 | | | 0.86 | 0.95 | |
| JS-H6 | 13.00 | | | 0.70 | 5.25 | | 0.74 | | 1.99 | | 0.23 | | 1.19 | | 0.22 | | 0.59 | | 0.09 | | 112.25 | | 107.30 | | 4.95 | | 21.68 | | | 37.04 | | | 0.89 | 0.96 | |
| JS-H7 | 17.00 | | | 0.60 | 4.03 | | 0.61 | | 1.66 | | 0.20 | | 1.06 | | 0.21 | | 0.54 | | 0.08 | | 90.36 | | 86.01 | | 4.35 | | 19.77 | | | 32.97 | | | 0.89 | 0.93 | |
| JS-H8 | 19.00 | | | 0.60 | 3.33 | | 0.54 | | 1.54 | | 0.19 | | 1.09 | | 0.22 | | 0.56 | | 0.08 | | 76.84 | | 72.59 | | 4.25 | | 17.08 | | | 29.42 | | | 0.90 | 0.94 | |
| JS-H9 | 16.00 | | | 0.70 | 4.08 | | 0.54 | | 1.53 | | 0.18 | | 1.01 | | 0.20 | | 0.53 | | 0.08 | | 90.03 | | 85.92 | | 4.11 | | 20.91 | | | 35.00 | | | 0.88 | 0.92 | |
| JS-H10 | 23.00 | | | 0.60 | 3.86 | | 0.61 | | 1.55 | | 0.21 | | 1.18 | | 0.22 | | 0.56 | | 0.08 | | 86.82 | | 82.43 | | 4.39 | | 18.78 | | | 32.21 | | | 0.92 | 0.94 | |

**Table 2 LA-ICP-MS zircon analytical data for the quartz diorite porphyries in the Jiangshan Au deposit**

Th U 207Pb/235U 206Pb/238U 207Pb/235U 206Pb/238U

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample No. |  |  |  |  | 2σ | Ratio | 2σ | Age (Ma) | 2σ | Age Ma) | 2σ |
| JS-01-01 | 469 | 1035 | 0.4531 | 0.1285 | 0.0042 | 0.0183 | 0.0002 | 122.70 | 3.8 | 117.00 | 1.5 |
| JS-01-02 | 451 | 1050 | 0.4295 | 0.1260 | 0.0047 | 0.0179 | 0.0002 | 120.40 | 4.3 | 114.20 | 1.5 |
| JS-01-03 | 441 | 1128 | 0.3910 | 0.1338 | 0.0096 | 0.0172 | 0.0002 | 127.10 | 8.4 | 109.90 | 1.3 |
| JS-01-04 | 371 | 836 | 0.4438 | 0.1176 | 0.0045 | 0.0178 | 0.0002 | 112.80 | 4.1 | 113.60 | 1.5 |
| JS-01-05 | 509 | 1048 | 0.4857 | 0.1220 | 0.0040 | 0.0173 | 0.0004 | 116.80 | 3.7 | 110.80 | 2.6 |
| JS-01-06 | 539 | 1114 | 0.4838 | 0.1170 | 0.0039 | 0.0169 | 0.0003 | 112.20 | 3.6 | 107.70 | 1.6 |
| JS-01-07 | 703 | 936 | 0.7511 | 0.1137 | 0.0037 | 0.0171 | 0.0003 | 109.30 | 3.4 | 109.10 | 1.6 |
| JS-01-08 | 358 | 939 | 0.3813 | 0.1134 | 0.0040 | 0.0173 | 0.0002 | 109.00 | 3.7 | 110.70 | 1.5 |
| JS-01-09 | 436 | 964 | 0.4523 | 0.1303 | 0.0054 | 0.0177 | 0.0003 | 124.20 | 4.8 | 113.20 | 1.6 |
| JS-01-10 | 328 | 938 | 0.3497 | 0.1197 | 0.0039 | 0.0177 | 0.0003 | 114.70 | 3.5 | 113.40 | 1.6 |
| JS-01-11 | 454 | 1023 | 0.4438 | 0.1202 | 0.0050 | 0.0167 | 0.0002 | 115.10 | 4.5 | 106.60 | 1.1 |
| JS-01-12 | 276 | 804 | 0.3433 | 0.1123 | 0.0038 | 0.0172 | 0.0003 | 108.90 | 3.8 | 109.60 | 1.6 |
| JS-01-13 | 469 | 1056 | 0.4441 | 0.1201 | 0.0043 | 0.0179 | 0.0003 | 115.10 | 3.9 | 114.10 | 1.6 |
| JS-01-14 | 331 | 858 | 0.3858 | 0.1188 | 0.0052 | 0.0180 | 0.0002 | 113.80 | 4.7 | 115.10 | 1.4 |
| JS-01-15 | 716 | 1482 | 0.4831 | 0.1291 | 0.0040 | 0.0174 | 0.0003 | 123.20 | 3.6 | 110.90 | 1.6 |

Table 3 LA-ICP-MS zircon trace elements (ppm) analytical result of the quartz diorite porphyrite in the Jiangshan Au deposit

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sampl No. | Ti | Y | Zr | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm |
| JS-01-01 | 5.80 | 664.00 | 213800.00 | 1.62 | 48.60 | 0.64 | 3.60 | 2.73 | 1.33 | 13.10 | 3.84 | 42.90 | 17.90 | 90.00 | 20.30 |
| JS-01-02 | 2.70 | 552.00 | 235700.00 | 1.04 | 32.00 | 0.92 | 5.50 | 3.97 | 1.86 | 13.10 | 3.88 | 43.50 | 15.90 | 75.50 | 17.80 |
| JS-01-03 | 3.50 | 540.00 | 245700.00 | 0.07 | 39.10 | 0.05 | 0.75 | 1.12 | 1.21 | 10.40 | 2.89 | 35.70 | 14.40 | 75.10 | 17.80 |
| JS-01-04 | 4.50 | 802.00 | 231000.00 | 0.05 | 34.80 | 0.11 | 1.32 | 3.50 | 1.40 | 15.50 | 4.56 | 52.10 | 21.70 | 110.80 | 25.70 |
| JS-01-05 | 2.90 | 720.00 | 227400.00 | 1.32 | 41.30 | 1.39 | 5.60 | 4.50 | 2.12 | 17.00 | 5.07 | 55.00 | 20.00 | 98.50 | 22.70 |
| JS-01-06 | 6.00 | 807.00 | 243000.00 | 0.12 | 37.90 | 0.06 | 1.42 | 3.11 | 1.36 | 13.90 | 5.12 | 57.10 | 23.00 | 112.80 | 25.50 |
| JS-01-07 | 7.90 | 1202.00 | 239100.00 | 2.30 | 75.30 | 0.64 | 6.00 | 6.30 | 2.64 | 27.60 | 8.31 | 96.70 | 36.20 | 166.80 | 36.40 |
| JS-01-08 | 3.60 | 748.00 | 240000.00 | 0.04 | 33.30 | 0.11 | 1.12 | 2.34 | 1.06 | 12.30 | 3.74 | 48.40 | 20.20 | 104.80 | 24.80 |
| JS-01-09 | 3.80 | 677.00 | 229500.00 | 0.33 | 33.60 | 0.16 | 1.48 | 2.49 | 1.40 | 12.90 | 3.90 | 48.50 | 18.40 | 92.80 | 22.40 |
| JS-01-10 | 2.30 | 615.00 | 240200.00 | 0.02 | 27.50 | 0.06 | 1.04 | 1.89 | 0.66 | 10.00 | 3.54 | 44.10 | 17.53 | 85.60 | 19.43 |
| JS-01-11 | 2.40 | 772.00 | 246900.00 | 0.02 | 38.40 | 0.07 | 0.45 | 2.04 | 1.11 | 14.70 | 4.52 | 54.50 | 21.30 | 108.10 | 24.90 |
| JS-01-12 | 1.30 | 802.00 | 256500.00 | 0.34 | 26.70 | 0.16 | 1.44 | 1.88 | 0.82 | 13.10 | 4.59 | 52.50 | 22.00 | 111.80 | 25.90 |
| JS-01-13 | 2.90 | 822.00 | 237100.00 | 0.06 | 38.30 | 0.05 | 0.91 | 2.11 | 1.38 | 15.00 | 4.51 | 55.30 | 22.60 | 113.80 | 25.80 |
| JS-01-14 | 3.70 | 596.00 | 248100.00 | 0.17 | 32.50 | 0.07 | 0.81 | 2.13 | 1.09 | 10.60 | 3.09 | 40.40 | 17.08 | 84.10 | 20.00 |
| JS-01-15 | 6.10 | 1068.00 | 246200.00 | 1.85 | 53.90 | 1.32 | 9.20 | 5.40 | 2.50 | 22.60 | 6.62 | 73.20 | 28.50 | 147.40 | 32.50 |
| Sampl No. | Yb | Lu | Hf | Pb | Pb | Pb | Pb | Th | U | fO2 | Ce4+ | Ce3+ | Eu/Eu\* | TTi-in-zircon |
| S-01-01 | 235 | 56.6 | 7480 | 2.3 | 83 | 4.66 | 5.98 | 469 | 1035 | –8.48 | 48.39 | 0.21 | 0.68 | 728.38 |
| JS-01-02 | 183 | 43.6 | 9950 | 2.4 | 83.4 | 4.69 | 5.84 | 451 | 1050 | –16.47 | 31.56 | 0.44 | 0.79 | 663.48 |
| JS-01-03 | 211 | 53.7 | 9360 | 4 | 87.1 | 5.28 | 5.8 | 441 | 1128 | –4.73 | 39.07 | 0.03 | 1.08 | 684.55 |
| JS-01-04 | 277 | 65.4 | 9130 | 1.8 | 68.1 | 3.6 | 4.59 | 371 | 836 | –7.87 | 34.71 | 0.09 | 0.58 | 705.87 |
| JS-01-05 | 234 | 55.8 | 9320 | 5.2 | 81.8 | 4.69 | 5.23 | 509 | 1048 | –15.14 | 40.87 | 0.43 | 0.74 | 669.19 |
| JS-01-06 | 266 | 59.6 | 10060 | 3.2 | 85.5 | 4.74 | 5.87 | 539 | 1114 | –6.29 | 37.81 | 0.09 | 0.63 | 731.47 |
| JS-01-07 | 344 | 75.4 | 8000 | 3.3 | 72.9 | 3.86 | 8.04 | 703 | 936 | –8.61 | 74.81 | 0.49 | 0.61 | 757.23 |
| JS-01-08 | 274 | 66.7 | 9560 | 1.2 | 72.3 | 3.8 | 4.37 | 358 | 939 | –7.44 | 33.24 | 0.06 | 0.6 | 686.89 |
| JS-01-09 | 228 | 53.2 | 9510 | 1.3 | 75.5 | 4.43 | 5.13 | 436 | 964 | –8.80 | 33.51 | 0.09 | 0.76 | 691.42 |
| JS-01-10 | 213.9 | 50.6 | 10680 | 0.46 | 72.7 | 3.95 | 3.78 | 328 | 938 | –10.14 | 27.44 | 0.06 | 0.46 | 650.93 |
| JS-01-11 | 271 | 61.5 | 10240 | 2.8 | 74.4 | 4.34 | 5.19 | 454 | 1023 | –5.96 | 38.37 | 0.03 | 0.62 | 654.23 |
| JS-01-12 | 286 | 68.9 | 10660 | 1.01 | 58.8 | 3.08 | 3.16 | 276 | 804 | –13.51 | 26.63 | 0.07 | 0.51 | 608.85 |
| JS-01-13 | 286 | 67.6 | 9640 | 2.9 | 80.7 | 4.31 | 5.11 | 469 | 1056 | –7.25 | 38.25 | 0.05 | 0.75 | 669.19 |
| JS-01-14 | 214.1 | 52.2 | 10010 | 1.3 | 65.4 | 3.42 | 3.96 | 331 | 858 | –6.62 | 32.45 | 0.05 | 0.7 | 689.18 |
| JS-01-15 | 368 | 87.9 | 10120 | 3.4 | 108.2 | 6.36 | 7.87 | 716 | 1482 | –11.73 | 53.32 | 0.58 | 0.69 | 732.98 |

**Table 4 Zircon Hf isotope data forthe quartz diorite porphyries in the Jianghsan deposit**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| JS-01-01 | 117.00 | 0.029611 | 0.001115 | 0.282170 | 0.000022 | **−**21.29 | 1531.25 | 2429.34 |
| JS-01-02 | 114.20 | 0.018202 | 0.000656 | 0.282141 | 0.000018 | **−**22.32 | 1552.77 | 2493.70 |
| JS-01-03 | 109.90 | 0.022419 | 0.000849 | 0.282155 | 0.000018 | **−**21.83 | 1541.64 | 2463.18 |
| JS-01-04 | 113.60 | 0.029160 | 0.001059 | 0.282124 | 0.000020 | **−**22.92 | 1592.97 | 2531.07 |
| JS-01-05 | 110.80 | 0.024649 | 0.000890 | 0.282118 | 0.000019 | **−**23.14 | 1594.75 | 2545.33 |
| JS-01-06 | 107.70 | 0.025434 | 0.000881 | 0.282127 | 0.000017 | **−**22.79 | 1580.72 | 2523.49 |
| JS-01-07 | 109.10 | 0.041224 | 0.001372 | 0.282156 | 0.000019 | **−**21.78 | 1561.25 | 2459.89 |
| JS-01-08 | 110.70 | 0.028758 | 0.001041 | 0.282141 | 0.000018 | **−**22.33 | 1569.11 | 2494.31 |
| JS-01-09 | 113.20 | 0.023746 | 0.000843 | 0.282174 | 0.000019 | **−**21.14 | 1514.19 | 2419.76 |
| JS-01-10 | 113.40 | 0.019840 | 0.000707 | 0.282107 | 0.000017 | **−**23.52 | 1602.05 | 2569.39 |
| JS-01-11 | 106.60 | 0.025267 | 0.000896 | 0.282152 | 0.000018 | **−**21.91 | 1546.69 | 2468.22 |
| JS-01-12 | 109.60 | 0.028005 | 0.000957 | 0.282118 | 0.000015 | **−**23.13 | 1597.28 | 2544.81 |
| JS-01-13 | 114.10 | 0.028874 | 0.001033 | 0.282143 | 0.000019 | **−**22.26 | 1566.04 | 2489.99 |
| JS-01-14 | 115.10 | 0.021566 | 0.000774 | 0.282160 | 0.000017 | **−**21.63 | 1530.64 | 2450.52 |
| JS-01-15 | 110.90 | 0.036739 | 0.001250 | 0.282129 | 0.000016 | **−**22.75 | 1594.67 | 2520.78 |

Sample No. *t* (Ma) 176Yb/177Hf 176Lu/177Hf 176Hf/177Hf ±2σ *ε*Hf (*t*) *t*DM1 (Ma) *t*DM2 (Ma)

**Table 5 Isotopic ages of intrusive rocks in the Bengbu area**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name  Changhuaiwei | Lithology  Monzonitic granite | Age (Ma)  112 | Method  SIMS U-Pb | References  Liu et al., 2012 |
| Caoshan | Granite | 112 | SHRIMP | Yang et al., 2010 |
| Yanshan | Granite | 113 | LA-ICP-MS | Song et al., 2016 |
| Xijiazhuang | Granodiorite | 114 | LA-ICP-MS | Chen et al., 2019 |
| Donglushan | Granite | 115 | LA-ICP-MS | Song et al., 2016 |
| Huangnishan | Granodiorite | 115 | SIMS U-Pb | Liu et al., 2012 |
| Jiangshan | Quartz diorite porphyrite | 111.5 | LA-ICP-MS | This study |
| Taoshan | Granite | 116 | LA-ICP-MS | Song et al., 2016 |
| Zhuizishan | Quartz syenite | 117 | Ar-Ar | Xu et al., 2005 |
| Xingshanan | Granodiorite | 118 | SIMS U-Pb | Liu et al., 2012 |
| Xilushan | Monzonitic granite | 129 | SHRIMP | Yang et al., 2010 |
| Huaiguang | Granodiorite | 130 | SHRIMP | Yang et al., 2010 |
| Huaiguang | Granodiorite | 130 | SHRIMP | Jin et al., 2003 |
| Nvshan | Granodiorite | 130 | SHRIMP | Yang et al., 2010 |
| Lilou | Granodiorite | 132 | Ar-Ar | Xu et al., 2005 |
| Laoshan | Gneiss granite | 159.2 | SHRIMP | Wang et al., 2009 |
| Mayishan | Granite | 160–162 | LA-ICP-MS | Song et al., 2016 |
| Xingshan | Granite | 160 | SHRIMP | Yang et al., 2010 |
| Xingshan | Granite | 160.2 | SHRIMP | Xu et al., 2004 |
| Xingshan | Granite | 162.8 | Ar-Ar | Qiu et al., 1999 |
| Xingshan | Granite | 165.5 | SIMS U-Pb | Li et al., 2010 |
| Xingshan | Granite | 167.3 | SHRIMP | Li et al., 2014 |