附表1凤水山地区安山岩全岩主量元素（%）、微量元素和稀土元素（10-6）数据

Table 1 Bulk-rock major elements（%），trace elements and rare earth elements（10-6）data of andesites in the Fengshui mountain area

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品号 | PM22YQ3 | YQ3772-1-1 | PM01YQ1 | PM01YQ2 | 样品号 | PM22YQ3 | YQ3772-1-1 | PM01YQ1 | PM01YQ2 |
| SiO2 | 53.52 | 60.38 | 56.52 | 55.53 | Tm | 0.36 | 0.42 | 0.32 | 0.53 |
| TiO2 | 1.10 | 0.97 | 1.14 | 1.67 | Yb | 2.32 | 2.65 | 1.90 | 3.18 |
| Al2O3 | 17.41 | 16.64 | 16.90 | 16.17 | Lu | 0.36 | 0.54 | 0.31 | 0.52 |
| Fe2O3 | 6.46 | 2.05 | 4.98 | 4.94 | Y | 23.9 | 29.6 | 24.3 | 40.7 |
| FeO | 0.95 | 3.18 | 2.08 | 3.63 | ΣREE | 183.3 | 238.5 | 266.7 | 313.0 |
| MnO | 0.12 | 0.089 | 0.11 | 0.14 | LREE | 165.8 | 218.2 | 248.1 | 285.0 |
| MgO | 5.97 | 1.96 | 3.04 | 3.09 | HREE | 17.5 | 20.3 | 18.6 | 28.0 |
| CaO | 5.27 | 3.64 | 4.72 | 5.11 | LREE/HREE | 9.49 | 10.74 | 13.33 | 10.17 |
| Na2O | 4.00 | 4.65 | 3.85 | 3.83 | *δ*Eu | 0.99 | 0.92 | 0.84 | 0.74 |
| K2O | 1.60 | 3.40 | 3.11 | 3.06 | (La/Yb)N | 11.41 | 13.46 | 20.40 | 13.05 |
| P2O5 | 0.26 | 0.24 | 0.59 | 0.86 | Cs | 1.07 | 3.39 | 7.35 | 3.61 |
| LOI | 3.13 | 2.59 | 2.65 | 1.70 | Rb | 54.9 | 100 | 95.5 | 90.3 |
| Total | 99.79 | 99.77 | 99.69 | 99.72 | Sr | 379 | 380 | 988 | 833 |
| Mg# | 75 | 47 | 57 | 50 | Ba | 944 | 1257 | 1169 | 1031 |
| Na2O /K2O | 2.51 | 1.37 | 1.23 | 1.25 | Ga | 23.3 | 22.1 | 23.1 | 23.7 |
| A/NK | 2.09 | 1.47 | 1.74 | 1.68 | Nb | 10.8 | 14.1 | 16.0 | 28.3 |
| A/CNK | 0.97 | 0.93 | 0.92 | 0.86 | Ta | 0.69 | 0.79 | 0.83 | 1.46 |
| La | 39.1 | 52.8 | 57.4 | 61.4 | Zr | 229 | 427 | 370 | 467 |
| Ce | 75.5 | 98.0 | 114 | 128 | Hf | 5.91 | 9.66 | 9.01 | 11.3 |
| Pr | 8.82 | 12.0 | 13.4 | 16.2 | Th | 7.40 | 8.93 | 8.94 | 7.70 |
| Nd | 34.4 | 45.5 | 52.3 | 65.1 | V | 122 | 88.4 | 137 | 151 |
| Sm | 6.05 | 7.69 | 8.77 | 11.8 | Cr | 161 | 33.1 | 26.8 | 49.9 |
| Eu | 1.90 | 2.24 | 2.27 | 2.70 | Co | 34.3 | 12.4 | 18.0 | 22.0 |
| Gd | 5.47 | 6.87 | 7.42 | 9.93 | Ni | 57.1 | 17.6 | 18.7 | 29.3 |
| Tb | 0.84 | 1.10 | 1.00 | 1.47 | Li | 32.3 | 26.8 | 47.6 | 23.2 |
| Dy | 4.77 | 5.33 | 4.61 | 7.30 | Sc | 18.6 | 14.9 | 12.5 | 17.0 |
| Ho | 0.89 | 1.02 | 0.82 | 1.37 | U | 1.36 | 1.58 | 1.81 | 1.32 |
| Er | 2.47 | 2.40 | 2.24 | 3.73 | Pb | 12.46 | 21.37 | 32.02 | 22.42 |

注：Mg#=100×MgO/（MgO+FeO\*）（摩尔比），FeO\*= FeO+0.899×Fe2O3.

附表2凤水山地区安山岩锆石LA-MC-ICP-MS U-Pb分析结果

Table 2 Zircon U-Pb analytical data of andesites in the Fengshui mountain area

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 测点号 | 含量（10-6） | | | Th/U | 同位素比值 | | | | | | 年龄（Ma） | | | | 谐和度 |
| Pb | Th | U | 207Pb/206Pb | 1*σ* | 207Pb/235U | 1*σ* | 206Pb/238U | 1*σ* | 207Pb/235U | 1*σ* | 206Pb/238U | 1*σ* |
| 样品YQ3772-1 | | | | | | | | | | | | | | | |
| YQ3772-1-1 | 5.76 | 114 | 112 | 1.02 | 0.0788 | 0.0085 | 0.3935 | 0.0434 | 0.0370 | 0.0010 | 336.9 | 32 | 234.0 | 6 | 63% |
| YQ3772-1-2 | 8.00 | 100 | 169 | 0.59 | 0.0546 | 0.0028 | 0.2929 | 0.0148 | 0.0396 | 0.0006 | 260.8 | 12 | 250.1 | 4 | 95% |
| YQ3772-1-3 | 14.04 | 251 | 272 | 0.92 | 0.0521 | 0.0027 | 0.2834 | 0.0150 | 0.0397 | 0.0006 | 253.4 | 12 | 250.8 | 4 | 98% |
| YQ3772-1-4 | 4.37 | 67 | 82 | 0.81 | 0.0665 | 0.0073 | 0.3818 | 0.0435 | 0.0420 | 0.0017 | 328.3 | 32 | 265.3 | 10 | 78% |
| YQ3772-1-5 | 7.49 | 92 | 164 | 0.56 | 0.0572 | 0.0045 | 0.2931 | 0.0219 | 0.0379 | 0.0007 | 261.0 | 17 | 239.8 | 4 | 91% |
| YQ3772-1-6 | 7.51 | 133 | 145 | 0.92 | 0.0570 | 0.0032 | 0.3100 | 0.0162 | 0.0403 | 0.0007 | 274.2 | 13 | 254.7 | 5 | 92% |
| YQ3772-1-7 | 8.75 | 104 | 188 | 0.55 | 0.0563 | 0.0031 | 0.2981 | 0.0161 | 0.0395 | 0.0007 | 264.9 | 13 | 249.8 | 4 | 94% |
| YQ3772-1-8 | 9.48 | 135 | 190 | 0.71 | 0.0541 | 0.0032 | 0.2908 | 0.0168 | 0.0397 | 0.0006 | 259.2 | 13 | 250.9 | 4 | 96% |
| YQ3772-1-9 | 10.83 | 152 | 219 | 0.70 | 0.0574 | 0.0031 | 0.3124 | 0.0166 | 0.0398 | 0.0006 | 276.0 | 13 | 251.3 | 3 | 90% |
| YQ3772-1-10 | 21.76 | 323 | 441 | 0.73 | 0.0516 | 0.0020 | 0.2798 | 0.0110 | 0.0394 | 0.0005 | 250.5 | 9 | 248.9 | 3 | 99% |
| YQ3772-1-11 | 6.63 | 137 | 123 | 1.12 | 0.0560 | 0.0030 | 0.3022 | 0.0163 | 0.0397 | 0.0008 | 268.1 | 13 | 250.9 | 5 | 93% |
| YQ3772-1-12 | 7.82 | 169 | 160 | 1.06 | 0.0542 | 0.0048 | 0.2646 | 0.0228 | 0.0361 | 0.0009 | 238.4 | 18 | 228.8 | 5 | 95% |
| YQ3772-1-13 | 6.00 | 96 | 119 | 0.80 | 0.0540 | 0.0034 | 0.2959 | 0.0186 | 0.0401 | 0.0006 | 263.2 | 15 | 253.5 | 4 | 96% |
| YQ3772-1-14 | 4.61 | 82 | 88 | 0.93 | 0.0692 | 0.0063 | 0.3772 | 0.0364 | 0.0406 | 0.0013 | 325.0 | 27 | 256.8 | 8 | 76% |
| YQ3772-1-15 | 32.52 | 465 | 650 | 0.72 | 0.0493 | 0.0014 | 0.2717 | 0.0076 | 0.0400 | 0.0004 | 244.0 | 6 | 252.6 | 3 | 96% |
| YQ3772-1-16 | 13.67 | 195 | 275 | 0.71 | 0.0484 | 0.0020 | 0.2660 | 0.0115 | 0.0399 | 0.0005 | 239.5 | 9 | 252.0 | 3 | 94% |
| YQ3772-1-17 | 8.76 | 131 | 180 | 0.73 | 0.0567 | 0.0031 | 0.2974 | 0.0156 | 0.0384 | 0.0006 | 264.4 | 12 | 242.9 | 4 | 91% |
| YQ3772-1-18 | 25.73 | 370 | 527 | 0.70 | 0.0502 | 0.0016 | 0.2773 | 0.0092 | 0.0399 | 0.0005 | 248.5 | 7 | 252.1 | 3 | 98% |
| YQ3772-1-19 | 7.83 | 155 | 145 | 1.07 | 0.0577 | 0.0036 | 0.3066 | 0.0179 | 0.0394 | 0.0007 | 271.5 | 14 | 249.2 | 4 | 91% |
| YQ3772-1-20 | 7.67 | 92 | 157 | 0.59 | 0.0542 | 0.0032 | 0.2938 | 0.0165 | 0.0395 | 0.0007 | 261.5 | 13 | 250.0 | 4 | 95% |
| YQ3772-1-21 | 4.76 | 90 | 85 | 1.06 | 0.0591 | 0.0053 | 0.3228 | 0.0286 | 0.0399 | 0.0011 | 284.0 | 22 | 252.0 | 7 | 88% |
| YQ3772-1-22 | 6.62 | 104 | 131 | 0.79 | 0.0560 | 0.0031 | 0.2980 | 0.0155 | 0.0394 | 0.0009 | 264.9 | 12 | 249.0 | 6 | 93% |
| YQ3772-1-23 | 3.90 | 55 | 79 | 0.70 | 0.0727 | 0.0085 | 0.3703 | 0.0421 | 0.0379 | 0.0011 | 319.9 | 31 | 239.8 | 7 | 71% |
| YQ3772-1-24 | 2.68 | 41 | 54 | 0.77 | 0.0816 | 0.0068 | 0.4224 | 0.0397 | 0.0381 | 0.0012 | 357.8 | 28 | 241.2 | 8 | 61% |
| 样品PM01YQ1 | | | | | | | | | | | | | | | |
| PM01YQ1-1 | 16.23 | 205 | 479 | 0.43 | 0.0529 | 0.0012 | 0.2156 | 0.0049 | 0.0297 | 0.0003 | 198.2 | 4 | 188.4 | 2 | 94% |
| PM01YQ1-2 | 16.90 | 232 | 379 | 0.61 | 0.0558 | 0.0015 | 0.2864 | 0.0072 | 0.0373 | 0.0004 | 255.7 | 6 | 236.2 | 2 | 92% |
| PM01YQ1-3 | 15.47 | 252 | 320 | 0.79 | 0.0563 | 0.0018 | 0.2966 | 0.0087 | 0.0384 | 0.0004 | 263.8 | 7 | 242.6 | 2 | 91% |
| PM01YQ1-4 | 18.29 | 231 | 411 | 0.56 | 0.0537 | 0.0012 | 0.2796 | 0.0059 | 0.0379 | 0.0004 | 250.3 | 5 | 239.7 | 2 | 95% |
| PM01YQ1-5 | 43.15 | 599 | 947 | 0.63 | 0.0530 | 0.0010 | 0.2796 | 0.0054 | 0.0383 | 0.0003 | 250.4 | 4 | 242.3 | 2 | 96% |
| PM01YQ1-6 | 10.02 | 140 | 214 | 0.66 | 0.0536 | 0.0026 | 0.2859 | 0.0131 | 0.0391 | 0.0005 | 255.4 | 10 | 247.4 | 3 | 96% |
| PM01YQ1-7 | 22.37 | 110 | 255 | 0.43 | 0.0603 | 0.0013 | 0.6396 | 0.0125 | 0.0772 | 0.0007 | 502 | 8 | 479.6 | 4 | 95% |
| PM01YQ1-8 | 17.06 | 299 | 357 | 0.84 | 0.0552 | 0.0019 | 0.2882 | 0.0088 | 0.0385 | 0.0010 | 257.1 | 7 | 243.3 | 6 | 94% |
| PM01YQ1-9 | 21.27 | 119 | 510 | 0.23 | 0.0535 | 0.0016 | 0.2856 | 0.0082 | 0.0388 | 0.0003 | 255.1 | 7 | 245.4 | 2 | 96% |
| PM01YQ1-10 | 17.77 | 280 | 382 | 0.73 | 0.0553 | 0.0015 | 0.2929 | 0.0082 | 0.0386 | 0.0005 | 260.8 | 6 | 243.9 | 3 | 93% |
| PM01YQ1-11 | 10.82 | 171 | 236 | 0.72 | 0.0531 | 0.0028 | 0.2781 | 0.0147 | 0.0381 | 0.0004 | 249.1 | 12 | 241.0 | 3 | 96% |
| PM01YQ1-12 | 20.09 | 504 | 377 | 1.34 | 0.0569 | 0.0017 | 0.3003 | 0.0093 | 0.0383 | 0.0004 | 266.6 | 7 | 242.3 | 3 | 90% |
| PM01YQ1-13 | 49.80 | 1002 | 992 | 1.01 | 0.0534 | 0.0011 | 0.2891 | 0.0060 | 0.0393 | 0.0003 | 257.9 | 5 | 248.7 | 2 | 96% |
| PM01YQ1-14 | 16.17 | 61 | 467 | 0.13 | 0.0547 | 0.0016 | 0.2535 | 0.0073 | 0.0337 | 0.0003 | 229.4 | 6 | 213.7 | 2 | 92% |
| PM01YQ1-15 | 6.82 | 107 | 154 | 0.69 | 0.0530 | 0.0023 | 0.2774 | 0.0131 | 0.0379 | 0.0008 | 248.6 | 10 | 239.5 | 5 | 96% |
| PM01YQ1-16 | 34.60 | 662 | 1201 | 0.55 | 0.0538 | 0.0014 | 0.1889 | 0.0053 | 0.0254 | 0.0002 | 175.7 | 5 | 161.7 | 2 | 91% |
| PM01YQ1-17 | 6.87 | 126 | 143 | 0.88 | 0.0575 | 0.0029 | 0.3047 | 0.0145 | 0.0390 | 0.0006 | 270.1 | 11 | 246.4 | 4 | 90% |
| PM01YQ1-18 | 10.33 | 166 | 208 | 0.80 | 0.0567 | 0.0025 | 0.3180 | 0.0132 | 0.0409 | 0.0005 | 280.3 | 10 | 258.3 | 3 | 91% |
| PM01YQ1-19 | 16.09 | 236 | 361 | 0.65 | 0.0570 | 0.0017 | 0.2957 | 0.0087 | 0.0377 | 0.0004 | 263.0 | 7 | 238.3 | 2 | 90% |
| PM01YQ1-20 | 20.81 | 272 | 470 | 0.58 | 0.0827 | 0.0077 | 0.4061 | 0.0366 | 0.0359 | 0.0004 | 346.1 | 26 | 227.5 | 2 | 58% |
| PM01YQ1-21 | 28.55 | 351 | 687 | 0.51 | 0.0534 | 0.0012 | 0.2695 | 0.0063 | 0.0366 | 0.0003 | 242.3 | 5 | 231.9 | 2 | 95% |
| PM01YQ1-22 | 18.84 | 74 | 323 | 0.23 | 0.1662 | 0.0126 | 0.9610 | 0.0821 | 0.0428 | 0.0019 | 683.8 | 43 | 270.0 | 12 | 13% |
| PM01YQ1-23 | 9.47 | 206 | 189 | 1.09 | 0.0518 | 0.0024 | 0.2770 | 0.0131 | 0.0388 | 0.0005 | 248.3 | 10 | 245.5 | 3 | 98% |
| PM01YQ1-24 | 11.03 | 162 | 240 | 0.67 | 0.0656 | 0.0022 | 0.3384 | 0.0128 | 0.0373 | 0.0005 | 296.0 | 10 | 236.2 | 3 | 77% |
| PM01YQ1-25 | 11.36 | 175 | 227 | 0.77 | 0.0741 | 0.0039 | 0.4015 | 0.0192 | 0.0394 | 0.0007 | 342.7 | 14 | 249.4 | 4 | 68% |