附表1 黄陵隆起样品40Ar/39Ar阶段加热定年结果

Table 1 Results of 40Ar/39Ar stepwise heating for three samples

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 阶段 | 36Ar | 1σ | 37Ar | 1σ | 38Ar | 1σ | 39Ar | 1σ | 40Ar | 1σ | 40Ar\*% | 40Ar\*/39Ar |
| 样品9531 (角闪石 50.68 mg)，J值：0.0017738±0.00000421，熔炉加热 |
| 1 | 700°C | 5.05E-03 | 5.44E-05 | 3.87E-03 | 6.57E-05 | 1.13E-03 | 6.20E-05 | 6.28E-03 | 6.31E-05 | 3.33E+00 | 3.77E-04 | 53.5 | 281.54 |
| 2 | 800°C | 4.03E-03 | 4.47E-05 | 1.31E-02 | 6.07E-05 | 1.28E-03 | 5.45E-05 | 2.43E-02 | 6.95E-05 | 5.44E+00 | 5.11E-04 | 77.4 | 171.57 |
| 3 | 900°C | 5.43E-03 | 4.85E-05 | 1.02E-01 | 8.06E-05 | 3.93E-03 | 6.43E-05 | 7.33E-02 | 7.63E-05 | 2.00E+01 | 1.94E-03 | 91.8 | 248.06 |
| 4 | 940°C | 4.46E-03 | 5.23E-05 | 5.10E-01 | 1.22E-04 | 2.18E-02 | 6.06E-05 | 3.17E-01 | 1.12E-04 | 9.56E+01 | 3.62E-01 | 98.7 | 296.09 |
| 5 | 950°C | 2.56E-03 | 5.01E-05 | 5.16E-01 | 1.26E-04 | 2.26E-02 | 5.54E-05 | 3.31E-01 | 1.23E-04 | 9.56E+01 | 4.44E-01 | 99.3 | 285.11 |
| 6 | 953°C | 1.69E-03 | 9.26E-05 | 3.94E-01 | 1.25E-04 | 1.74E-02 | 9.67E-05 | 2.56E-01 | 1.17E-04 | 8.61E+01 | 4.44E-03 | 99.5 | 332.29 |
| 7 | 955°C | 1.26E-03 | 7.90E-05 | 3.26E-01 | 1.24E-04 | 1.44E-02 | 7.86E-05 | 2.14E-01 | 1.03E-04 | 7.18E+01 | 1.37E-02 | 99.6 | 332.44 |
| 8 | 956°C | 1.07E-03 | 8.14E-05 | 2.79E-01 | 1.19E-04 | 1.24E-02 | 6.86E-05 | 1.84E-01 | 1.20E-04 | 6.18E+01 | 5.87E-03 | 99.6 | 332.61 |
| 9 | 957°C | 8.46E-04 | 8.04E-05 | 2.46E-01 | 1.12E-04 | 1.09E-02 | 7.61E-05 | 1.63E-01 | 1.03E-04 | 5.47E+01 | 8.01E-03 | 99.6 | 332.53 |
| 10 | 958°C | 7.28E-04 | 7.88E-05 | 2.16E-01 | 1.02E-04 | 9.60E-03 | 6.77E-05 | 1.44E-01 | 1.09E-04 | 4.82E+01 | 7.75E-03 | 99.6 | 332.42 |
| 11 | 959°C | 6.24E-04 | 7.95E-05 | 2.00E-01 | 1.14E-04 | 8.90E-03 | 6.99E-05 | 1.33E-01 | 9.25E-05 | 4.48E+01 | 3.54E-03 | 99.7 | 332.47 |
| 12 | 960°C | 5.65E-04 | 8.68E-05 | 1.84E-01 | 9.82E-05 | 8.14E-03 | 7.07E-05 | 1.23E-01 | 9.82E-05 | 4.12E+01 | 2.48E-03 | 99.7 | 332.54 |
| 13 | 962°C | 4.58E-04 | 7.75E-05 | 1.81E-01 | 1.10E-04 | 8.08E-03 | 7.54E-05 | 1.21E-01 | 1.03E-04 | 4.07E+01 | 5.18E-03 | 99.7 | 332.53 |
| 14 | 968°C | 4.71E-04 | 7.90E-05 | 2.22E-01 | 1.06E-04 | 9.81E-03 | 7.37E-05 | 1.49E-01 | 9.11E-05 | 4.98E+01 | 5.28E-03 | 99.8 | 332.52 |
| 15 | 980°C | 6.19E-04 | 8.13E-05 | 3.64E-01 | 1.40E-04 | 1.62E-02 | 7.47E-05 | 2.44E-01 | 1.22E-04 | 8.17E+01 | 1.40E-02 | 99.9 | 332.17 |
| 16 | 1000°C | 6.02E-04 | 7.69E-05 | 2.81E-01 | 9.95E-05 | 1.25E-02 | 7.41E-05 | 1.90E-01 | 9.94E-05 | 6.38E+01 | 7.09E-03 | 99.8 | 333.72 |
| 17 | 1010°C | 3.48E-04 | 7.84E-05 | 3.00E-01 | 1.34E-04 | 1.34E-02 | 6.77E-05 | 2.05E-01 | 1.07E-04 | 6.82E+01 | 1.41E-02 | 99.9 | 329.87 |
| 18 | 1020°C | 1.16E-04 | 6.35E-05 | 1.14E-01 | 9.81E-05 | 5.02E-03 | 7.43E-05 | 7.89E-02 | 9.86E-05 | 2.64E+01 | 2.56E-03 | 100.0 | 332.23 |
| 19 | 1050°C | 2.96E-04 | 7.29E-05 | 1.78E-01 | 1.11E-04 | 7.37E-03 | 7.70E-05 | 1.15E-01 | 1.05E-04 | 3.86E+01 | 2.52E-03 | 99.9 | 332.27 |
| 20 | 1080°C | 4.93E-04 | 6.64E-05 | 2.86E-01 | 1.18E-04 | 1.19E-02 | 8.26E-05 | 1.82E-01 | 1.00E-04 | 6.10E+01 | 8.58E-03 | 99.8 | 333.51 |
| 21 | 1090°C | 3.60E-04 | 6.38E-05 | 2.59E-01 | 1.08E-04 | 1.14E-02 | 7.81E-05 | 1.74E-01 | 9.87E-05 | 5.88E+01 | 7.76E-03 | 99.9 | 334.59 |
| 22 | 1100°C | 9.41E-05 | 6.54E-05 | 1.13E-01 | 9.87E-05 | 4.99E-03 | 6.16E-05 | 7.68E-02 | 8.98E-05 | 2.60E+01 | 2.69E-03 | 100.0 | 335.51 |
| 23 | 1140°C | 1.25E-04 | 6.53E-05 | 7.26E-02 | 9.59E-05 | 3.22E-03 | 6.39E-05 | 4.98E-02 | 9.14E-05 | 1.69E+01 | 1.17E-03 | 99.9 | 335.87 |
| 24 | 1200°C | 4.52E-05 | 6.70E-05 | 7.67E-03 | 8.97E-05 | 3.11E-04 | 7.14E-05 | 5.29E-03 | 8.12E-05 | 1.83E+00 | 3.75E-04 | 99.3 | 341.36 |
| 样品5632 (白云母 1.89 mg )，J值：0.0017803±0.0000036356，CO2激光熔样 |
| 1 | 2.0% | 3.07E-04 | 6.36E-05 | 5.29E-05 | 7.40E-05 | 9.99E-05 | 6.51E-05 | 5.32E-03 | 7.93E-05 | 1.04E+00 | 2.70E-04 | 91.0 | 4.47 |
| 2 | 2.5% | 4.90E-04 | 6.22E-05 | 0 | 6.17E-05 | 3.46E-04 | 6.97E-05 | 2.78E-02 | 7.01E-05 | 7.56E+00 | 7.03E-04 | 98.0 | 0.95 |
| 3 | 2.8% | 3.49E-04 | 6.81E-05 | 1.02E-05 | 6.31E-05 | 5.93E-04 | 7.12E-05 | 4.11E-02 | 8.54E-05 | 1.30E+01 | 1.41E-03 | 99.2 | 0.82 |
| 4 | 3.1% | 5.08E-04 | 6.42E-05 | 0 | 6.96E-05 | 9.32E-04 | 6.33E-05 | 7.84E-02 | 8.17E-05 | 2.56E+01 | 2.84E-03 | 99.4 | 0.42 |
| 5 | 3.4% | 2.60E-04 | 5.75E-05 | 0 | 7.18E-05 | 7.31E-04 | 6.91E-05 | 5.52E-02 | 7.98E-05 | 1.81E+01 | 2.13E-03 | 99.6 | 0.57 |
| 6 | 3.7% | 2.88E-04 | 6.21E-05 | 1.10E-05 | 6.95E-05 | 8.30E-04 | 6.40E-05 | 7.09E-02 | 7.91E-05 | 2.34E+01 | 2.66E-03 | 99.6 | 0.45 |
| 7 | 4.0% | 3.35E-04 | 6.27E-05 | 0 | 6.75E-05 | 9.66E-04 | 7.47E-05 | 7.51E-02 | 9.35E-05 | 2.48E+01 | 4.91E-03 | 99.6 | 0.48 |
| 8 | 4.3% | 2.83E-04 | 8.07E-05 | 4.63E-05 | 9.20E-05 | 8.42E-04 | 6.61E-05 | 6.58E-02 | 8.87E-05 | 2.17E+01 | 3.93E-03 | 99.6 | 0.58 |
| 9 | 4.6% | 1.82E-04 | 7.04E-05 | 0 | 8.09E-05 | 7.66E-04 | 7.32E-05 | 5.84E-02 | 9.47E-05 | 1.92E+01 | 3.08E-03 | 99.7 | 0.64 |
| 10 | 5.0% | 1.86E-04 | 6.46E-05 | 2.67E-05 | 7.87E-05 | 5.97E-04 | 7.43E-05 | 4.70E-02 | 8.17E-05 | 1.55E+01 | 1.66E-03 | 99.6 | 0.70 |
| 11 | 5.4% | 4.60E-05 | 1.24E-04 | 0 | 1.15E-04 | 4.54E-04 | 1.20E-04 | 4.24E-02 | 1.23E-04 | 1.40E+01 | 1.59E-03 | 99.9 | 1.30 |
| 12 | 5.8% | 0 | 8.83E-05 | 0 | 9.63E-05 | 4.48E-04 | 8.18E-05 | 3.77E-02 | 1.12E-04 | 1.25E+01 | 1.37E-03 | 100.0 | 1.21 |
| 13 | 6.2% | 1.68E-04 | 6.87E-05 | 0 | 7.27E-05 | 6.84E-04 | 7.34E-05 | 5.72E-02 | 8.99E-05 | 1.89E+01 | 2.92E-03 | 99.7 | 0.63 |
| 14 | 6.7% | 2.12E-04 | 7.27E-05 | 3.79E-06 | 8.73E-05 | 9.29E-04 | 7.95E-05 | 7.46E-02 | 8.79E-05 | 2.47E+01 | 2.80E-03 | 99.7 | 0.49 |
| 15 | 7.2% | 4.16E-04 | 8.30E-05 | 2.54E-06 | 9.26E-05 | 1.54E-03 | 8.72E-05 | 1.21E-01 | 1.29E-04 | 4.03E+01 | 3.00E-02 | 99.7 | 0.48 |
| 16 | 7.7% | 6.37E-04 | 7.49E-05 | 6.68E-05 | 8.28E-05 | 2.55E-03 | 7.28E-05 | 2.04E-01 | 1.07E-04 | 6.79E+01 | 3.91E-03 | 99.7 | 0.21 |
| 17 | 8.3% | 4.38E-04 | 5.83E-05 | 5.57E-06 | 6.63E-05 | 2.02E-03 | 7.38E-05 | 1.56E-01 | 1.12E-04 | 5.16E+01 | 2.44E-03 | 99.7 | 0.26 |
| 18 | 8.9% | 4.15E-04 | 6.13E-05 | 5.11E-05 | 6.68E-05 | 1.81E-03 | 6.29E-05 | 1.37E-01 | 9.34E-05 | 4.54E+01 | 3.42E-03 | 99.7 | 0.26 |
| 19 | 9.5% | 3.70E-04 | 8.28E-05 | 0 | 1.12E-04 | 1.60E-03 | 7.60E-05 | 1.30E-01 | 1.04E-04 | 4.33E+01 | 8.39E-03 | 99.7 | 0.34 |
| 20 | 10.2% | 1.05E-04 | 5.59E-05 | 0 | 6.52E-05 | 5.79E-04 | 6.19E-05 | 5.13E-02 | 8.56E-05 | 1.71E+01 | 9.68E-04 | 99.8 | 0.64 |
| 21 | 10.9% | 0 | 6.94E-05 | 0 | 7.41E-05 | 1.84E-04 | 7.19E-05 | 2.55E-02 | 7.64E-05 | 8.52E+00 | 4.96E-04 | 100.0 | 1.29 |
| 22 | 11.6% | 0 | 7.47E-05 | 0 | 7.71E-05 | 2.21E-04 | 7.35E-05 | 2.45E-02 | 7.62E-05 | 8.18E+00 | 6.32E-04 | 100.0 | 1.39 |
| 23 | 12.5% | 1.38E-04 | 6.48E-05 | 0 | 6.44E-05 | 9.89E-04 | 6.65E-05 | 8.91E-02 | 8.69E-05 | 2.98E+01 | 3.26E-03 | 99.9 | 0.39 |
| 24 | 14.5% | 7.09E-05 | 7.13E-05 | 0 | 8.61E-05 | 6.66E-04 | 7.92E-05 | 5.78E-02 | 8.90E-05 | 1.93E+01 | 2.02E-03 | 99.9 | 0.63 |
| 25 | 16.5% | 0 | 6.21E-05 | 0 | 7.84E-05 | 4.24E-04 | 6.82E-05 | 4.32E-02 | 7.49E-05 | 1.45E+01 | 1.77E-03 | 100.0 | 0.72 |
| 样品10SN7 (黑云母 2.11 mg )，J值：0.0017856±0.0000044138，CO2激光熔样 |
| 1 | 2.0% | 3.51E-04 | 5.65E-05 | 1.27E-04 | 6.99E-05 | 1.07E-04 | 5.23E-05 | 1.67E-03 | 6.34E-05 | 2.27E-01 | 4.73E-04 | 52.9 | 10.62 |
| 2 | 2.5% | 3.34E-04 | 5.07E-05 | 6.92E-04 | 6.75E-05 | 3.09E-04 | 6.73E-05 | 1.43E-02 | 6.98E-05 | 1.06E+00 | 1.21E-03 | 90.4 | 1.13 |
| 3 | 2.8% | 2.89E-04 | 5.25E-05 | 9.56E-04 | 7.32E-05 | 4.01E-04 | 6.66E-05 | 2.19E-02 | 6.76E-05 | 1.91E+00 | 2.83E-03 | 95.4 | 0.78 |
| 4 | 3.1% | 3.28E-04 | 5.78E-05 | 1.14E-03 | 6.68E-05 | 5.34E-04 | 6.02E-05 | 2.91E-02 | 7.35E-05 | 3.19E+00 | 2.00E-03 | 96.9 | 0.66 |
| 5 | 3.4% | 3.74E-04 | 5.27E-05 | 1.46E-03 | 5.98E-05 | 6.89E-04 | 5.47E-05 | 3.73E-02 | 7.82E-05 | 6.04E+00 | 1.28E-03 | 98.1 | 0.54 |
| 6 | 3.7% | 3.06E-04 | 6.32E-05 | 1.32E-03 | 6.69E-05 | 6.53E-04 | 5.92E-05 | 3.80E-02 | 7.78E-05 | 7.61E+00 | 8.17E-04 | 98.8 | 0.64 |
| 7 | 4.0% | 4.34E-04 | 5.32E-05 | 1.17E-03 | 6.19E-05 | 8.16E-04 | 5.65E-05 | 5.24E-02 | 7.85E-05 | 1.39E+01 | 1.24E-03 | 99.1 | 0.50 |
| 8 | 4.3% | 1.81E-04 | 5.18E-05 | 7.28E-04 | 6.03E-05 | 6.35E-04 | 6.32E-05 | 3.50E-02 | 7.65E-05 | 1.06E+01 | 5.51E-04 | 99.5 | 0.79 |
| 9 | 4.6% | 1.55E-04 | 5.16E-05 | 6.19E-04 | 6.50E-05 | 6.33E-04 | 5.79E-05 | 3.85E-02 | 7.99E-05 | 1.25E+01 | 1.05E-03 | 99.6 | 0.78 |
| 10 | 4.9% | 1.17E-04 | 5.37E-05 | 3.78E-04 | 7.78E-05 | 5.17E-04 | 5.72E-05 | 3.26E-02 | 7.79E-05 | 1.09E+01 | 7.86E-04 | 99.7 | 0.93 |
| 11 | 5.3% | 1.26E-04 | 5.68E-05 | 4.45E-04 | 7.10E-05 | 5.77E-04 | 6.25E-05 | 3.71E-02 | 7.12E-05 | 1.29E+01 | 1.41E-03 | 99.7 | 0.81 |
| 12 | 5.7% | 5.54E-05 | 5.73E-05 | 3.51E-04 | 6.55E-05 | 4.97E-04 | 5.57E-05 | 2.85E-02 | 7.36E-05 | 1.01E+01 | 7.11E-04 | 99.8 | 1.09 |
| 13 | 6.1% | 1.38E-04 | 4.73E-05 | 2.81E-04 | 6.88E-05 | 4.25E-04 | 6.32E-05 | 2.47E-02 | 7.56E-05 | 8.85E+00 | 4.78E-04 | 99.5 | 1.23 |
| 14 | 6.6% | 8.68E-05 | 5.39E-05 | 2.67E-04 | 6.39E-05 | 3.42E-04 | 6.19E-05 | 2.14E-02 | 7.39E-05 | 7.66E+00 | 4.00E-04 | 99.7 | 1.44 |
| 15 | 7.1% | 4.03E-05 | 5.28E-05 | 2.64E-04 | 7.24E-05 | 3.05E-04 | 5.95E-05 | 2.06E-02 | 6.96E-05 | 7.43E+00 | 6.54E-04 | 99.8 | 1.44 |
| 16 | 7.6% | 3.85E-05 | 6.24E-05 | 2.85E-04 | 7.16E-05 | 3.74E-04 | 6.05E-05 | 2.23E-02 | 7.73E-05 | 8.13E+00 | 5.92E-04 | 99.9 | 1.51 |
| 17 | 8.1% | 5.90E-05 | 5.65E-05 | 4.15E-04 | 7.38E-05 | 3.96E-04 | 6.35E-05 | 2.77E-02 | 7.24E-05 | 1.02E+01 | 7.58E-04 | 99.8 | 1.14 |
| 18 | 8.7% | 2.05E-05 | 5.57E-05 | 6.27E-04 | 6.79E-05 | 6.10E-04 | 5.88E-05 | 4.05E-02 | 6.96E-05 | 1.49E+01 | 1.62E-03 | 100.0 | 0.75 |
| 19 | 9.5% | 9.62E-05 | 5.23E-05 | 1.02E-03 | 6.66E-05 | 8.36E-04 | 5.40E-05 | 6.55E-02 | 7.09E-05 | 2.39E+01 | 2.41E-03 | 99.9 | 0.46 |
| 20 | 10.5% | 7.32E-05 | 5.34E-05 | 1.56E-03 | 8.23E-05 | 1.32E-03 | 6.41E-05 | 1.03E-01 | 7.19E-05 | 3.74E+01 | 5.47E-03 | 99.9 | 0.30 |
| 21 | 11.5% | 9.35E-05 | 5.73E-05 | 1.59E-03 | 7.08E-05 | 1.13E-03 | 5.80E-05 | 8.85E-02 | 7.78E-05 | 3.14E+01 | 3.44E-03 | 99.9 | 0.37 |
| 22 | 12.5% | 6.19E-05 | 5.55E-05 | 5.06E-04 | 7.35E-05 | 5.24E-04 | 6.14E-05 | 3.50E-02 | 8.12E-05 | 1.22E+01 | 2.71E-03 | 99.8 | 0.93 |
| 23 | 14.5% | 6.83E-05 | 5.74E-05 | 4.94E-04 | 6.51E-05 | 4.22E-04 | 7.31E-05 | 2.62E-02 | 6.64E-05 | 9.00E+00 | 7.80E-04 | 99.8 | 1.09 |
| 24 | 20.0% | 4.26E-05 | 6.08E-05 | 1.21E-03 | 6.69E-05 | 5.17E-04 | 6.03E-05 | 3.82E-02 | 7.02E-05 | 1.27E+01 | 1.19E-03 | 99.9 | 0.78 |
| 25 | 25.0% | 0.00E+00 | 5.85E-05 | 1.01E-03 | 6.99E-05 | 3.97E-04 | 5.71E-05 | 3.04E-02 | 7.49E-05 | 9.48E+00 | 8.29E-04 | 100.0 | 0.96 |