附表1 官坡地区花岗伟晶岩主量元素（wt%）和微量元素（×10-6）组成

Table 1 Major（wt%）and trace（×10-6）element data of Guanpo pegmatites

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 岩石类型 | 样号 | SiO2 | Al2O3 | Fe2O3 | FeO | CaO | MgO | K2O | Na2O | TiO2 | P2O5 | MnO | 灼失 | 总量 | *σ* | K2O/Na2O | A/CNK |
| 锂辉石钠长石伟晶岩 | H2/PD06 | 87.99 | 8.10 | 0.12 | 0.10 | 0.42 | 0.12 | 1.03 | 0.94 | 0.015  | 0.10 | 0.05 | 0.99 | 99.97 | 0.09 | 1.10 | 2.36 |
| 锂辉石微斜长石钠长石伟晶岩 | H3/PD06 | 78.00 | 13.35 | 0.21 | 0.15 | 0.52 | 0.08 | 2.52 | 3.33 | 0.034  | 0.37 | 0.12 | 1.30 | 99.99 | 0.98 | 0.76 | 1.46 |
| 锂辉石微斜长石伟晶岩 | H4/PD06 | 71.55 | 15.52 | 0.03 | 0.07 | 1.00 | 0.14 | 6.83 | 2.97 | 0.023  | 0.53 | 0.10 | 1.21 | 99.98 | 3.36 | 2.30 | 1.10 |
| 粉色电气石钠长石伟晶岩 | H1/PD15 | 63.45 | 24.31 | 0.01 | 0.10 | 0.33 | 0.05 | 3.30 | 5.74 | 0.021  | 0.16 | 0.18 | 2.34 | 100.00 | 2.29 | 0.57 | 1.17 |
| 电气石钠长石微斜长石伟晶岩 | B2/D02 | 74.45 | 15.01 | 0.51 | 0.10 | 0.60 | 0.16 | 4.03 | 4.45 | 0.060  | 0.14 | 0.01 | 0.45 | 99.97 | 3.53 | 0.91 | 1.13 |
| 电气石钠长石微斜长石伟晶岩 | B3/D02 | 73.73 | 14.60 | 0.22 | 0.10 | 0.16 | 0.10 | 7.99 | 2.42 | 0.046  | 0.15 | 0.01 | 0.44 | 99.97 | 1.65 | 3.30 | 1.15 |
| 电气石钠长石微斜长石伟晶岩 | B1/D03 | 78.59 | 11.76 | 0.42 | 0.26 | 0.34 | 0.10 | 5.45 | 2.22 | 0.029  | 0.13 | 0.10 | 0.58 | 99.97 | 2.28 | 2.45 | 1.22 |
| 电气石钠长石微斜长石伟晶岩 | B1/D04 | 75.08 | 14.17 | 0.59 | 0.12 | 0.37 | 0.13 | 5.67 | 2.89 | 0.038  | 0.21 | 0.03 | 0.69 | 99.99 | 4.00 | 1.96 | 1.78 |
| 锂辉石锂云母伟晶岩 | B1/GP | 72.32 | 15.26 | 0.24 | 0.73 | 1.17 | 0.22 | 3.93 | 2.45 | 0.012  | 0.79 | 0.26 | 2.55 | 99.93 | 1.39 | 1.60 | 1.46 |
| 锂辉石锂云母伟晶岩 | B2/GP | 70.03 | 16.97 | 0.06 | 0.67 | 1.53 | 0.26 | 3.38 | 2.52 | 0.009  | 1.16 | 0.14 | 3.15 | 99.88 | 1.29 | 1.34 | 1.60 |
| 锂辉石锂云母伟晶岩 | B3/GP | 71.64 | 15.26 | 0.24 | 0.56 | 1.78 | 0.18 | 4.10 | 1.82 | 0.007  | 0.86 | 0.15 | 3.29 | 99.88 | 1.22 | 2.25 | 1.43 |
| 锂辉石锂云母伟晶岩 | B4/GP | 74.51 | 14.19 | 0.05 | 0.79 | 1.51 | 0.18 | 2.46 | 2.45 | 0.007  | 0.57 | 0.11 | 3.03 | 99.85 | 0.77 | 1.00 | 1.50 |
| 黑色电气石白云母伟晶岩 | B5/GP | 77.24 | 13.62 | 1.23 | 0.73 | 0.27 | 0.10 | 1.24 | 4.43 | 0.028  | 0.13 | 0.05 | 0.84 | 99.91 | 0.94 | 0.28 | 1.49 |
| 黑色电气石白云母伟晶岩 | B6/GP | 72.64 | 16.35 | 0.23 | 0.36 | 0.47 | 0.03 | 1.98 | 6.33 | 0.016  | 0.52 | 0.10 | 0.90 | 99.92 | 2.33 | 0.31 | 1.22 |
| 黑色电气石白云母伟晶岩 | B7/GP | 74.90 | 14.05 | 0.32 | 0.40 | 0.56 | 0.03 | 4.69 | 3.74 | 0.015  | 0.38 | 0.09 | 0.71 | 99.89 | 2.23 | 1.25 | 1.15 |
| 黑色电气石白云母伟晶岩 | B8/GP | 74.91 | 14.93 | 0.53 | 0.32 | 0.34 | 0.20 | 3.08 | 3.31 | 0.015  | 0.26 | 0.04 | 2.01 | 99.95 | 1.28 | 0.93 | 1.59 |
| 黑色电气石白云母伟晶岩 | B9/GP | 70.65 | 16.13 | 0.32 | 0.44 | 0.37 | 0.13 | 8.03 | 2.18 | 0.005  | 0.41 | 0.03 | 1.20 | 99.89 | 3.77 | 3.68 | 1.24 |
| 岩石类型 | 样号 | Rb | Cs | Sr | Ba | Nb | Ta | Zr | Hf | Ga | U | Th | La | Ce | Pr | Nd | Sm |
| 锂辉石钠长石伟晶岩 | H2/PD06 | 759  |  | 25.10  | 20.10  | 31.60  | 8.47  | 6.83  | 0.68  | 18.80  | 1.49  | 0.27  | 0.280  | 0.560  | 0.064  | 0.250  | 0.056  |
| 锂辉石微斜长石钠长石伟晶岩 | H3/PD06 | 2170  |  | 24.40  | 25.80  | 66.10  | 31.80  | 6.39  | 0.82  | 31.20  | 3.86  | 0.81  | 0.660  | 1.340  | 0.120  | 0.430  | 0.070  |
| 锂辉石微斜长石伟晶岩 | H4/PD06 | 3970  |  | 17.60  | 20.00  | 26.10  | 22.40  | 5.93  | 0.77  | 21.30  | 1.02  | 0.30  | 0.150  | 0.150  | 0.017  | 0.051  | 0.008  |
| 粉色电气石钠长石伟晶岩 | H1/PD15 | 5660  |  | 11.90  | 14.00  | 59.40  | 108.00  | 8.63  | 2.16  | 35.80  | 10.60  | 1.30  | 0.140  | 0.200  | 0.030  | 0.100  | 0.020  |
| 电气石钠长石微斜长石伟晶岩 | B2/D02 | 200  |  | 7.92  | 23.60  | 1.35  | 0.68  | 16.30  | 0.80  | 12.90  | 1.62  | 2.15  | 3.210  | 6.740  | 0.830  | 3.040  | 1.220  |
| 电气石钠长石微斜长石伟晶岩 | B3/D02 | 396  |  | 11.80  | 52.20  | 3.02  | 0.30  | 3.30  | 0.11  | 9.66  | 0.36  | 0.17  | 0.240  | 0.630  | 0.054  | 0.200  | 0.110  |
| 电气石钠长石微斜长石伟晶岩 | B1/D03 | 288  |  | 11.30  | 83.80  | 17.00  | 8.92  | 18.80  | 1.43  | 10.10  | 1.54  | 0.78  | 0.830  | 1.410  | 0.180  | 0.640  | 0.210  |
| 电气石钠长石微斜长石伟晶岩 | B1/D04 | 382  |  | 5.38  | 42.00  | 14.80  | 2.02  | 9.38  | 0.58  | 15.90  | 1.13  | 0.85  | 0.970  | 1.920  | 0.280  | 1.050  | 0.770  |
| 锂辉石锂云母伟晶岩 | B1/GP | 1804  | 739  | 106.00  | 47.00  | 103.00  | 88.30  | 7.30  | 1.00  | 33.60  | 9.12  | 1.50  | 0.510  | 0.800  | 0.077 | 0.230  | 0.086  |
| 锂辉石锂云母伟晶岩 | B2/GP | 2731  | 1317  | 64.00  | 51.00  | 126.00  | 134.50  | 12.40  | 1.86  | 42.60  | 8.70  | 3.47  | 0.330  | 0.540  | 0.051  | 0.180  | 0.088  |
| 锂辉石锂云母伟晶岩 | B3/GP | 2223  | 846  | 136.00  | 55.00  | 105.00  | 104.20  | 4.40  | 0.59  | 35.60  | 6.34  | 3.04  | 0.460  | 0.670  | 0.064  | 0.230  | 0.100  |
| 锂辉石锂云母伟晶岩 | B4/GP | 1531  | 664  | 125.00  | 27.00  | 116.00  | 119.50  | 12.50  | 1.62  | 33.50  | 7.62  | 2.14  | 0.320  | 0.500  | 0.048  | 0.180  | 0.079  |
| 黑色电气石白云母伟晶岩 | B5/GP | 173  | 41  | 7.00  | 15.00  | 310.00  | 39.90  | 37.90  | 2.31  | 28.40  | 1.80  | 5.77  | 2.180  | 4.900  | 0.560  | 1.960  | 1.087  |
| 黑色电气石白云母伟晶岩 | B6/GP | 674  | 93  | 19.00  | 50.00  | 89.00  | 112.00  | 23.50  | 3.10  | 41.00  | 1.09  | 1.98  | 9.060  | 1.860  | 1.752  | 6.240  | 1.031  |
| 黑色电气石白云母伟晶岩 | B7/GP | 991  | 128  | 77.00  | 362.00  | 148.00  | 128.80  | 22.40  | 2.18  | 31.40  | 1.74  | 1.09  | 1.290  | 2.120  | 0.292  | 0.990  | 0.363  |
| 黑色电气石白云母伟晶岩 | B8/GP | 645  | 228  | 11.00  | 39.00  | 61.00  | 32.50  | 11.70  | 1.24  | 37.00  | 0.51  | 0.94  | 0.780  | 1.660  | 0.186  | 0.620  | 0.460  |
| 黑色电气石白云母伟晶岩 | B9/GP | 3028  | 714  | 37.00  | 47.00  | 49.00  | 40.10  | 20.10  | 1.96  | 28.50  | 0.88  | 0.54  | 1.080  | 0.550  | 0.192  | 0.700  | 0.176  |
| 岩石类型 | 样号 | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | Nb/Ta | ∑REE | LREE/HREE | （La/Yb）N | *δ*Eu | TE3,4 |
| 锂辉石钠长石伟晶岩 | H2/PD06 | 0.015  | 0.068  | 0.012  | 0.084  | 0.017  | 0.048  | 0.007  | 0.050  | 0.009  | 0.410  | 3.731  | 1.520  | 4.155  | 4.017  | 0.742  | 0.956  |
| 锂辉石微斜长石钠长石伟晶岩 | H3/PD06 | 0.018  | 0.084  | 0.014  | 0.082  | 0.018  | 0.054  | 0.010  | 0.063  | 0.009  | 0.470  | 2.079  | 2.970  | 7.905  | 7.515  | 0.717  | 1.037  |
| 锂辉石微斜长石伟晶岩 | H4/PD06 | 0.006  | 0.012  | 0.003  | 0.012  | 0.003  | 0.007  | 0.002  | 0.010  | 0.001  | 0.091  | 1.165  | 0.430  | 7.792  | 11.208  | 1.840  | 1.355  |
| 粉色电气石钠长石伟晶岩 | H1/PD15 | 0.004  | 0.016  | 0.004  | 0.026  | 0.004  | 0.010  | 0.002  | 0.010  | 0.001  | 0.140  | 0.550  | 0.567  | 6.792  | 10.247  | 0.628  | 1.379  |
| 电气石钠长石微斜长石伟晶岩 | B2/D02 | 0.040  | 1.510  | 0.310  | 2.540  | 0.510  | 1.220  | 0.180  | 1.050  | 0.130  | 16.50  | 1.985  | 22.530  | 2.024  | 2.193  | 0.090  | 1.097  |
| 电气石钠长石微斜长石伟晶岩 | B3/D02 | 0.038  | 0.140  | 0.042  | 0.320  | 0.068  | 0.170  | 0.027  | 0.150  | 0.018  | 2.110  | 10.07 | 2.207  | 1.360  | 1.148  | 0.936  | 1.220  |
| 电气石钠长石微斜长石伟晶岩 | B1/D03 | 0.092  | 0.350  | 0.064  | 0.450  | 0.110  | 0.360  | 0.062  | 0.460  | 0.074  | 2.220  | 1.906  | 5.292  | 1.742  | 1.294  | 1.031  | 0.987  |
| 电气石钠长石微斜长石伟晶岩 | B1/D04 | 0.048  | 1.050  | 0.250  | 1.920  | 0.400  | 0.970  | 0.160  | 1.000  | 0.120  | 13.40  | 7.327  | 10.908  | 0.858  | 0.696  | 0.163  | 1.169  |
| 锂辉石锂云母伟晶岩 | B1/GP | 0.020  | 0.052  | 0.011  | 0.062  | 0.011  | 0.026  | 0.005  | 0.039  | 0.005  | 0.400  | 1.166  | 1.930  | 8.166  | 9.380  | 0.846  | 1.207  |
| 锂辉石锂云母伟晶岩 | B2/GP | 0.015  | 0.041  | 0.007  | 0.055  | 0.008  | 0.028  | 0.005  | 0.041  | 0.003  | 0.320  | 0.937  | 1.390  | 6.404  | 5.773  | 0.668  | 1.358  |
| 锂辉石锂云母伟晶岩 | B3/GP | 0.021  | 0.063  | 0.011  | 0.079  | 0.014  | 0.042  | 0.004  | 0.044  | 0.006  | 0.560  | 1.008  | 1.810  | 5.875  | 7.499  | 0.754  | 0.951  |
| 锂辉石锂云母伟晶岩 | B4/GP | 0.018  | 0.041  | 0.006  | 0.039  | 0.007  | 0.023  | 0.005  | 0.029  | 0.003  | 0.360  | 0.971  | 1.298  | 7.484  | 7.915  | 0.867  | 1.194  |
| 黑色电气石白云母伟晶岩 | B5/GP | 0.042  | 1.291  | 0.400  | 1.612  | 0.156  | 0.328  | 0.053  | 0.329  | 0.037  | 6.460  | 7.769  | 14.935  | 2.551  | 4.753  | 0.108  | 1.529  |
| 黑色电气石白云母伟晶岩 | B6/GP | 0.247  | 1.160  | 0.153  | 0.799  | 0.132  | 0.335  | 0.045  | 0.292  | 0.035  | 5.000  | 0.795  | 23.141  | 6.842  | 22.256  | 0.688  | 1.015  |
| 黑色电气石白云母伟晶岩 | B7/GP | 0.114  | 0.350  | 0.099  | 0.435  | 0.049  | 0.107  | 0.017  | 0.127  | 0.018  | 1.900  | 1.149  | 6.371  | 4.300  | 7.286  | 0.965  | 1.352  |
| 黑色电气石白云母伟晶岩 | B8/GP | 0.028  | 0.662  | 0.245  | 0.868  | 0.073  | 0.113  | 0.014  | 0.083  | 0.011  | 3.260  | 1.877  | 5.803  | 1.805  | 6.741  | 0.155  | 1.487  |
| 黑色电气石白云母伟晶岩 | B9/GP | 0.034  | 0.137  | 0.018  | 0.107  | 0.023  | 0.059  | 0.008  | 0.050  | 0.012  | 0.680  | 1.222  | 3.146  | 6.599  | 15.494  | 0.645  | 0.800  |

注：H2/PD06、H3/PD06、H4/PD06、H1/PD15、B2/D02、B3/D02、B1/D03、B1/D04样品数据为作者在天津地质调查中心实验室测试，B1/GP、B2/GP、B3/GP、B4/GP、B5/GP、B6/GP、B7/GP、B8/GP、B9/GP样品数据引自王盘喜等（2017），里特曼指数*σ*=（K2O+Na2O）2/（SiO2-43）, A/CNK=n（Al2O3）/[ n（CaO）+n（Na2O）+n（K2O）]（分子数）, A/NK=n（Al2O3）/[n（Na2O）+n（K2O）]（分子数）