附表1 瓦吉里塔格碱性煌斑岩LA-ICP-MS锆石U-Pb年龄分析结果

**Table 1 LA-ICP-MS zircon U-Pb dating results of the Wajilitag alkaline lamprophyre**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 样品号 | Pb ppm | 232Th ppm | 238U ppm | U-Th-Pb同位素比值 | 年龄/Ma |
| 207Pb/206Pb | 1σ | 207Pb/235U | 1σ | 206Pb/238U | 1σ | 208Pb/232Th | 1σ | 207Pb/206Pb | 1σ | 207Pb/235U | 1σ | 206Pb/238U | 1σ | 208Pb/232Th | 1σ |
| WJL-14-1 | 13.39  | 234.93  | 229.83  | 0.05054  | 0.00123  | 0.30742  | 0.00662  | 0.04414  | 0.00052  | 0.01500  | 0.00066  | 220  | 57  | 272  | 5  | 278  | 3  | 301  | 13  |
| WJL-14-2 | 7.13  | 122.63  | 126.05  | 0.05219  | 0.00168  | 0.31913  | 0.00912  | 0.04415  | 0.00046  | 0.01399  | 0.00031  | 295  | 72  | 281  | 7  | 278  | 3  | 281  | 6  |
| WJL-14-3 | 9.73  | 151.94  | 175.25  | 0.05207  | 0.00135  | 0.32013  | 0.00771  | 0.04417  | 0.00049  | 0.01418  | 0.00027  | 287  | 59  | 282  | 6  | 279  | 3  | 285  | 5  |
| WJL-14-4 | 38.15  | 1095.79  | 561.38  | 0.05233  | 0.00068  | 0.31942  | 0.00464  | 0.04409  | 0.00041  | 0.01292  | 0.00015  | 298  | -3  | 281  | 4  | 278  | 3  | 259  | 3  |
| WJL-14-5 | 19.05  | 477.70  | 294.12  | 0.05210  | 0.00105  | 0.31737  | 0.00606  | 0.04417  | 0.00042  | 0.01386  | 0.00016  | 300  | 51  | 280  | 5  | 279  | 3  | 278  | 3  |
| WJL-14-6 | 12.31  | 219.92  | 218.67  | 0.05204  | 0.00106  | 0.31585  | 0.00619  | 0.04396  | 0.00043  | 0.01368  | 0.00019  | 287  | 46  | 279  | 5  | 277  | 3  | 275  | 4  |
| WJL-14-7 | 20.26  | 560.62  | 297.62  | 0.05456  | 0.00100  | 0.32904  | 0.00536  | 0.04383  | 0.00044  | 0.01373  | 0.00020  | 394  | 41  | 289  | 4  | 277  | 3  | 276  | 4  |
| WJL-14-8 | 7.56  | 137.42  | 131.83  | 0.05162  | 0.00143  | 0.31520  | 0.00771  | 0.04417  | 0.00045  | 0.01373  | 0.00021  | 333  | 60  | 278  | 6  | 279  | 3  | 276  | 4  |
| WJL-14-9 | 13.45  | 250.02  | 220.16  | 0.05030  | 0.00176  | 0.31367  | 0.00639  | 0.04463  | 0.00040  | 0.01517  | 0.00058  | 209  | 81  | 277  | 5  | 281  | 2  | 304  | 11  |
| WJL-14-10 | 14.35  | 331.48  | 235.49  | 0.05275  | 0.00097  | 0.31848  | 0.00599  | 0.04381  | 0.00044  | 0.01317  | 0.00018  | 317  | 45  | 281  | 5  | 276  | 3  | 264  | 4  |
| WJL-14-11 | 8.45  | 200.65  | 129.70  | 0.04787  | 0.00161  | 0.29361  | 0.00715  | 0.04467  | 0.00047  | 0.01419  | 0.00021  | 100  | 81  | 261  | 6  | 282  | 3  | 285  | 4  |
| WJL-14-12 | 9.75  | 169.78  | 172.30  | 0.0504  | 0.00118  | 0.30794  | 0.00639  | 0.04450  | 0.00044  | 0.01332  | 0.00020  | 213  | 83  | 273  | 5  | 281  | 3  | 268  | 4  |
| WJL-14-13 | 8.68  | 151.15  | 153.93  | 0.05381  | 0.00195  | 0.32649  | 0.00959  | 0.04406  | 0.00047  | 0.01383  | 0.00023  | 365  | 81  | 287  | 7  | 278  | 3  | 278  | 4  |
| WJL-14-14 | 12.82  | 322.44  | 193.85  | 0.05204  | 0.00125  | 0.31559  | 0.00640  | 0.04402  | 0.00042  | 0.01394  | 0.00019  | 287  | 56  | 279  | 5  | 278  | 3  | 280  | 4  |
| WJL-14-15 | 15.75  | 384.66  | 245.43  | 0.05121  | 0.00123  | 0.31063  | 0.00538  | 0.04410  | 0.00044  | 0.01349  | 0.00016  | 250  | 56  | 275  | 4  | 278  | 3  | 271  | 3  |
| WJL-14-16 | 7.39  | 142.24  | 123.45  | 0.04974  | 0.00163  | 0.30722  | 0.00801  | 0.04480  | 0.00053  | 0.01437  | 0.00040  | 183  | 76  | 272  | 6  | 283  | 3  | 288  | 8  |
| WJL-14-17 | 10.40  | 187.81  | 182.60  | 0.05349  | 0.00173  | 0.32093  | 0.00862  | 0.04348  | 0.00047  | 0.01425  | 0.00044  | 350  | 72  | 283  | 7  | 274  | 3  | 286  | 9  |
| WJL-14-18 | 17.28  | 339.93  | 290.96  | 0.05064  | 0.00119  | 0.30952  | 0.00543  | 0.04439  | 0.00044  | 0.01371  | 0.00015  | 233  | 54  | 274  | 4  | 280  | 3  | 275  | 3  |
| WJL-14-19 | 28.82  | 1000.20  | 394.02  | 0.05174  | 0.00108  | 0.31265  | 0.00572  | 0.04394  | 0.00051  | 0.01338  | 0.00020  | 272  | 44  | 276  | 4  | 277  | 3  | 269  | 4  |
| WJL-14-20 | 6.09  | 93.73  | 109.19  | 0.04973  | 0.00177  | 0.3049  | 0.00794  | 0.04453  | 0.00052  | 0.01397  | 0.00023  | 189  | 83  | 270  | 6  | 281  | 3  | 280  | 5  |

附表2-1瓦吉里塔格碱性煌斑岩中橄榄石斑晶成分

**Table 2-1 Chemical compositions of olivine phenocrysts in the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | BC-32 | BC-32 | BC-32 | BC-32 | BC-32 | BC-32 | BC-32 | BC-32 |
| 位置 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| 　 | 边 | 核 | 核 | 边 | 核 | 核 | 核 | 核 |
| SiO2(%) | 38.0  | 38.2  | 37.7  | 36.0  | 35.8  | 35.6  | 35.9  | 36.3  |
| TiO2 | 0.05  | 0.03  | 0.04  | 0.03  | 0.03  | 0.03  | 0.03  | 0.04  |
| Al2O3 | 0.03  | 0.05  | 0.02  | 0.03  | 0.02  | 0.02  | 0.02  | 0.02  |
| FeO | 28.7  | 24.9  | 27.3  | 29.7  | 27.7  | 28.1  | 26.6  | 26.1  |
| MnO | 0.42  | 0.52  | 0.44  | 0.47  | 0.48  | 0.48  | 0.49  | 0.50  |
| MgO | 33.0  | 37.4  | 36.0  | 32.2  | 34.7  | 34.4  | 35.7  | 35.7  |
| CaO | 1.00  | 0.40  | 0.35  | 0.34  | 0.26  | 0.35  | 0.28  | 0.32  |
| Na2O | 0.04  | 0.18  | 0.00  | 0.04  | 0.01  | 0.01  | 0.01  | 0.02  |
| Total | 101.2  | 101.7  | 101.9  | 98.8  | 99.0  | 99.0  | 99.0  | 99.0  |
| Fo | 67.2  | 72.8  | 70.2  | 66.0  | 69.0  | 68.6  | 70.6  | 70.9  |
| Li(×10-6) |  |  |  | 10.6  | 20.2  | 16.1  | 19.0  | 23.4  |
| B |  |  |  | 13.2  | 0.76  | 29.9  | 2.36  | 5.83  |
| Sc |  |  |  | 5.35  | 5.09  | 5.70  | 5.08  | 5.33  |
| V |  |  |  | 6.20  | 4.98  | 5.44  | 6.07  | 5.86  |
| Cr |  |  |  | 4.88  | 2.40  | 2.96  | 17.70  | 3.52  |
| Co |  |  |  | 214  | 212  | 213  | 222  | 219  |
| Ni |  |  |  | 626  | 587  | 656  | 673  | 657  |
| Zn |  |  |  | 291  | 270  | 274  | 264  | 325  |
| Ga |  |  |  | 0.30  | 0.22  | 0.22  | 0.18  | 0.27  |
| Rb |  |  |  | 1.97  | 0.00  | 0.35  | 0.00  | 0.46  |
| Sr |  |  |  | 6.62  | 0.20  | 16.54  | 0.09  | 2.10  |
| Y |  |  |  | 0.65  | 0.47  | 0.39  | 0.42  | 0.48  |
| Zr |  |  |  | 0.25  | 0.32  | 0.00  | 0.24  | 0.32  |
| Nb |  |  |  | 0.03  | 0.01  | 0.01  | 0.00  | 0.01  |
| La |  |  |  | 0.71  | 0.01  | 0.38  | 0.01  | 0.22  |
| Ce |  |  |  | 0.78  | 0.02  | 0.54  | 0.02  | 0.31  |
| Pr |  |  |  | 0.07  | 0.00  | 0.02  | 0.00  | 0.02  |
| Nd |  |  |  | 0.28  | 0.00  | 0.07  | 0.02  | 0.18  |
| Sm |  |  |  | 0.00  | 0.02  | 0.02  | 0.00  | 0.04  |
| Eu |  |  |  | 0.00  | 0.00  | 0.00  | 0.00  | 0.03  |
| Gd |  |  |  | 0.11  | 0.05  | 0.08  | 0.02  | 0.02  |
| Tb |  |  |  | 0.01  | 0.00  | 0.01  | 0.00  | 0.01  |
| Dy |  |  |  | 0.14  | 0.08  | 0.03  | 0.04  | 0.06  |
| Ho |  |  |  | 0.03  | 0.02  | 0.03  | 0.02  | 0.02  |
| Er |  |  |  | 0.05  | 0.10  | 0.05  | 0.03  | 0.05  |
| Tm |  |  |  | 0.01  | 0.01  | 0.02  | 0.00  | 0.01  |
| Yb |  |  |  | 0.09  | 0.15  | 0.15  | 0.17  | 0.04  |
| Lu | 　 | 　 | 　 | 0.02  | 0.01  | 0.03  | 0.02  | 0.02  |

附表2-2瓦吉里塔格碱性煌斑岩中单斜辉石成分

**Table 2-2 EMPA analysis of clinopyroxenes in the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | BC-2 | BC-2 | BC-2 | BC-30 | BC-30 | BC-30 | BC-30 | BC-30 | BC-30 | BC-32 | BC-32 | BC-32 |
| 位置 | 1 | 2 | 3 | 10  | 11  | 12  | 13  | 14  | 15  | 1  | 2  | 3  |
|  | 核 | 核 | 核 | 核 | 幔 | 幔 | 幔 | 幔 | 边 | 边 | 幔 | 幔 |
| SiO2(%) | 53.2  | 53.4  | 53.1  | 51.88  | 52.34  | 53.11  | 52.15  | 52.10  | 51.43  | 51.0  | 52.5  | 48.4  |
| TiO2 | 1.27  | 1.20  | 1.25  | 1.61  | 1.60  | 1.33  | 1.60  | 1.61  | 1.31  | 1.38  | 0.78  | 2.10  |
| Al2O3 | 3.26  | 2.84  | 2.66  | 3.37  | 2.69  | 2.42  | 2.81  | 2.91  | 2.41  | 3.03  | 1.98  | 4.64  |
| FeO | 7.53  | 6.31  | 6.58  | 7.25  | 7.19  | 7.19  | 7.84  | 7.33  | 7.20  | 8.54  | 6.86  | 8.81  |
| MnO | 0.16  | 0.13  | 0.10  | 0.17  | 0.20  | 0.12  | 0.21  | 0.17  | 0.19  | 0.15  | 0.15  | 0.13  |
| MgO | 13.0  | 12.4  | 13.6  | 14.3  | 14.7  | 15.1  | 14.3  | 14.6  | 14.0  | 14.6  | 16.3  | 13.8  |
| CaO | 19.6  | 20.5  | 19.6  | 21.7  | 22.2  | 21.5  | 22.11  | 21.7  | 21.3  | 21.3  | 20.9  | 21.1  |
| K2O | 0.04  | 0.04  | 0.00  | 0.00  | 0.01  | 0.01  | 0.00  | 0.02  | 0.01  | 0.01  | 0.00  | 0.01  |
| Na2O | 0.53  | 0.44  | 0.56  | 0.44  | 0.40  | 0.38  | 0.36  | 0.35  | 0.34  | 0.38  | 0.37  | 0.41  |
| Cr2O3 | 0.00  | 0.02  | 0.24  | 0.06  | 0.05  | 0.03  | 0.00  | 0.02  | 0.00  | 0.02  | 0.40  | 0.06  |
| Total | 98.5  | 97.2  | 97.6  | 100.8  | 101.4  | 101.1  | 101.3  | 100.8  | 98.1  | 100.4  | 100.3  | 99.5  |
| 以6个O原子为基础计算的离子数 |
| Si | 2.01  | 2.05  | 2.02  | 1.91  | 1.91  | 1.94  | 1.91  | 1.92  | 1.95  | 1.89  | 1.93  | 1.81  |
| Ti | 0.04  | 0.04  | 0.04  | 0.04  | 0.04  | 0.04  | 0.04  | 0.04  | 0.04  | 0.04  | 0.02  | 0.06  |
| Al (T) | 0.00  | 0.00  | 0.00  | 0.09  | 0.09  | 0.06  | 0.09  | 0.08  | 0.05  | 0.11  | 0.07  | 0.19  |
| Al(M1) | 0.15  | 0.13  | 0.12  | 0.05  | 0.03  | 0.05  | 0.03  | 0.04  | 0.05  | 0.02  | 0.01  | 0.01  |
| Fe3+  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.04  | 0.03  | 0.09  |
| Fe2+ | 0.24  | 0.20  | 0.21  | 0.22  | 0.22  | 0.22  | 0.24  | 0.23  | 0.23  | 0.22  | 0.18  | 0.19  |
| Mn | 0.01  | 0.00  | 0.00  | 0.01  | 0.01  | 0.00  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.00  |
| Mg | 0.73  | 0.71  | 0.77  | 0.79  | 0.80  | 0.82  | 0.78  | 0.80  | 0.79  | 0.80  | 0.89  | 0.77  |
| Ca | 0.79  | 0.84  | 0.80  | 0.85  | 0.87  | 0.84  | 0.87  | 0.86  | 0.86  | 0.84  | 0.82  | 0.85  |
| K | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  |
| Na | 0.04  | 0.03  | 0.04  | 0.03  | 0.03  | 0.03  | 0.03  | 0.02  | 0.03  | 0.03  | 0.03  | 0.03  |
| Cr | 0.00  | 0.00  | 0.01  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.01  | 0.00  |
| Wo | 44.9  | 48.0  | 44.8  | 45.7  | 45.9  | 44.6  | 45.9  | 45.3  | 45.7  | 44.0  | 42.6  | 44.6  |
| En | 41.4  | 40.3  | 43.3  | 42.1  | 42.2  | 43.5  | 41.1  | 42.4  | 41.9  | 41.9  | 46.2  | 40.7  |
| Fs | 13.8  | 11.8  | 11.9  | 12.2  | 11.9  | 11.9  | 13.0  | 12.2  | 12.4  | 14.0  | 11.2  | 14.7  |

续附表2-2

**Table 2-2 (continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BC-32 | BC-32 | BC-32 | BC-32 | BC-32 | WJL-16 | WJL-16 | WJL-16 | WJL-16 | WJL-16 | WJL-16 | WJL-20 | WJL-20 |
| 4  | 5  | 6  | 7  | 13  | 1  | 2  | 3  | 4  | 5  | 6  | 6  | 2  |
| 核 | 边 | 核 | 基质 | 基质 | 核 | 幔 | 幔 | 边 | 边 | 核 | 核 | 核 |
| 51.0  | 50.9  | 49.9  | 51.7  | 50.1  | 49.6  | 49.4  | 50.4  | 50.9  | 49.0  | 51.0  | 49.5  | 51.1  |
| 1.36  | 1.47  | 1.65  | 1.25  | 1.35  | 1.70  | 1.84  | 1.38  | 1.28  | 2.29  | 1.44  | 1.55  | 1.40  |
| 2.85  | 3.01  | 3.52  | 2.54  | 3.01  | 4.10  | 4.40  | 2.85  | 2.67  | 4.24  | 2.86  | 3.02  | 3.09  |
| 7.50  | 8.95  | 9.15  | 8.96  | 9.08  | 8.41  | 8.26  | 9.77  | 10.17  | 10.41  | 8.12  | 8.70  | 7.65  |
| 0.12  | 0.19  | 0.14  | 0.18  | 0.19  | 0.17  | 0.16  | 0.22  | 0.20  | 0.24  | 0.15  | 0.15  | 0.13  |
| 15.5  | 14.1  | 13.7  | 14.6  | 14.9  | 14.5  | 13.8  | 14.4  | 14.0  | 12.9  | 14.9  | 15.6  | 15.1  |
| 21.5  | 21.4 | 21.5  | 21.0  | 21.5  | 21.6  | 21.8  | 20.7  | 20.7  | 21.0  | 21.8  | 21.4  | 21.8  |
| 0.01  | 0.00  | 0.00  | 0.00  | 0.00  | 0.01  | 0.01  | 0.00  | 0.00  | 0.01  | 0.00  | 0.02  | 0.02  |
| 0.36  | 0.38  | 0.30  | 0.36  | 0.39  | 0.39  | 0.46  | 0.41  | 0.44  | 0.52  | 0.30  | 0.53  | 0.65  |
| 0.20  | 0.02  | 0.00  | 0.01  | 0.02  | 0.00  | 0.00  | 0.01  | 0.00  | 0.02  | 0.00  | 0.07  | 0.29  |
| 100.4  | 100.4  | 99.9  | 100.6  | 100.5  | 100.3  | 100.1  | 100.2  | 100.3  | 100.6  | 100.6  | 100.5  | 101.2  |
| 以6个O原子为基础计算的离子数 |
| 1.88  | 1.89  | 1.86  | 1.91  | 1.85  | 1.83  | 1.83  | 1.87  | 1.90  | 1.83  | 1.88  | 1.82  | 1.86  |
| 0.04  | 0.04  | 0.05  | 0.04  | 0.04  | 0.05  | 0.05  | 0.04  | 0.04  | 0.06  | 0.04  | 0.04  | 0.04  |
| 0.12  | 0.11  | 0.14  | 0.09  | 0.13  | 0.17  | 0.17  | 0.13  | 0.11  | 0.17  | 0.12  | 0.13  | 0.13  |
| 0.00  | 0.02  | 0.02  | 0.02  | 0.00  | 0.01  | 0.03  | 0.00  | 0.01  | 0.01  | 0.00  | 0.00  | 0.00  |
| 0.07  | 0.04  | 0.05  | 0.03  | 0.13  | 0.09  | 0.07  | 0.08  | 0.05  | 0.07  | 0.06  | 0.18  | 0.10  |
| 0.16  | 0.24  | 0.24  | 0.25  | 0.16  | 0.17  | 0.18  | 0.22  | 0.26  | 0.26  | 0.19  | 0.08  | 0.13  |
| 0.00  | 0.01  | 0.00  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.00  |
| 0.85  | 0.78  | 0.76  | 0.80  | 0.82  | 0.80  | 0.76  | 0.80  | 0.77  | 0.72  | 0.82  | 0.86  | 0.82  |
| 0.85  | 0.85  | 0.86  | 0.83  | 0.85  | 0.85  | 0.87  | 0.83  | 0.82  | 0.84  | 0.86  | 0.84  | 0.85  |
| 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  |
| 0.03  | 0.03  | 0.02  | 0.03  | 0.03  | 0.03  | 0.03  | 0.03  | 0.03  | 0.04  | 0.02  | 0.04  | 0.05  |
| 0.01  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.01  |
| 43.9  | 44.5  | 45.0  | 43.4  | 43.4  | 44.6  | 45.8  | 42.7  | 42.9  | 44.4  | 44.5  | 42.7  | 44.7  |
| 44.0  | 40.7  | 39.9  | 41.9  | 42.0  | 41.6  | 40.4  | 41.3  | 40.3  | 37.9  | 42.3  | 43.5  | 42.9  |
| 12.2  | 14.8  | 15.2  | 14.7  | 14.6  | 13.9  | 13.8  | 16.1  | 16.8  | 17.6  | 13.2  | 13.8  | 12.5  |

续表2-2

**Table 2-2 (continued)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| WJL-20 | WJL-20 | WJL-20 | DW10-2\* | DW14-1\* | DW32-2\* | WJIL32-2\* | WJIL19-1\* | WJL19-1\* | WJL20-1\* | WJL20-1\* |
| 8  | 9  | 10  | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 |
| 核 | 幔 | 边 |  |  |  |  |  |  |  |  |
| 50.5  | 50.4  | 50.3  | 48.9  | 50.6  | 48.7  | 50.0  | 50.4  | 49.9  | 49.3  | 50.1  |
| 1.49  | 1.77  | 1.61  | 2.54  | 1.32  | 2.86  | 2.16  | 1.97  | 1.76  | 2.07  | 1.64  |
| 4.02  | 3.14  | 3.76  | 7.32  | 3.77  | 4.26  | 3.95  | 4.23  | 3.74  | 4.06  | 3.04  |
| 8.71  | 9.33  | 8.79  | 7.03  | 8.09  | 7.37  | 7.80  | 8.22  | 7.61  | 8.79  | 8.16  |
| 0.14  | 0.20  | 0.16  | 0.17  | 0.31  | 0.27  | 0.18  | 0.14  | 0.09  | 0.21  | 0.11  |
| 14.3  | 14.1  | 14.4  | 13.0  | 14.8  | 14.0  | 14.0  | 13.3  | 14.4  | 13.7  | 14.5  |
| 21.3  | 21.7  | 21.5  | 18.2  | 20.0  | 21.1  | 21.3  | 20.9  | 21.1  | 20.1  | 20.2  |
| 0.02  | 0.02  | 0.02  | 0.25  | 0.07  | 0.07  | 0.12  | 0.11  | 0.03  | 0.32  | 0.09  |
| 0.48  | 0.38  | 0.45  | 1.29  | 0.76  | 0.65  | 0.75  | 0.69  | 0.80  | 1.57  | 1.06  |
| 0.24  | 0.04  | 0.01  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  |
| 101.2  | 101.1  | 101.0  | 98.6  | 99.7  | 99.2  | 100.2  | 100.0  | 99.5  | 100.2  | 98.9  |
| 以6个O原子为基础计算的离子数 |
| 1.85  | 1.86  | 1.85  | 1.84  | 1.88  | 1.83  | 1.85  | 1.88  | 1.86  | 1.83  | 1.88  |
| 0.04  | 0.05  | 0.04  | 0.07  | 0.04  | 0.08  | 0.06  | 0.06  | 0.05  | 0.06  | 0.05  |
| 0.15  | 0.14  | 0.15  | 0.16  | 0.12  | 0.17  | 0.15  | 0.12  | 0.14  | 0.17  | 0.12  |
| 0.03  | 0.00  | 0.01  | 0.16  | 0.04  | 0.02  | 0.03  | 0.07  | 0.03  | 0.01  | 0.01  |
| 0.07  | 0.07  | 0.09  | 0.00  | 0.04  | 0.03  | 0.04  | 0.00  | 0.05  | 0.14  | 0.07  |
| 0.20  | 0.21  | 0.18  | 0.22  | 0.21  | 0.20  | 0.20  | 0.26  | 0.18  | 0.13  | 0.18  |
| 0.00  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.00  | 0.00  | 0.01  | 0.00  |
| 0.78  | 0.78  | 0.79  | 0.73  | 0.82  | 0.78  | 0.77  | 0.74  | 0.80  | 0.76  | 0.81  |
| 0.84  | 0.86  | 0.85  | 0.73  | 0.80  | 0.85  | 0.85  | 0.83  | 0.84  | 0.80  | 0.81  |
| 0.00  | 0.00  | 0.00  | 0.06  | 0.04  | 0.03  | 0.04  | 0.03  | 0.04  | 0.07  | 0.05  |
| 0.03  | 0.03  | 0.03  | 0.02  | 0.01  | 0.01  | 0.01  | 0.01  | 0.00  | 0.02  | 0.01  |
| 0.01  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  |
| 44.2  | 44.4  | 44.3  | 43.4  | 42.5  | 45.4  | 45.4  | 45.4  | 44.7  | 43.5  | 43.1  |
| 41.4  | 40.3  | 41.3  | 43.2  | 43.6  | 41.8  | 41.4  | 40.4  | 42.5  | 41.3  | 43.1  |
| 14.3  | 15.3  | 14.4  | 13.4  | 13.9  | 12.8  | 13.2  | 14.2  | 12.7  | 15.2  | 13.8  |

带\*样品数据引自王璐（2014）附表2-3瓦吉里塔格碱性煌斑岩中角闪石成分

**Table 2-3 EMPA analysis of amphiboles in the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | WJL-11 | WJL-11 | WJL-11 | WJL-11 | WJL-11 | WJL-11 | WJL-11 | WJL-11 | WJL-11 |
| 位置 | 1-核 | 2-幔 | 3-边 | 8-基质 | 10 | 11-核 | 12-边 | 13-幔 | 15-核 |
| SiO2(%) | 40.1  | 39.6  | 40.0  | 38.9  | 40.7  | 40.1  | 40.2  | 40.1  | 38.4  |
| TiO2 | 5.33  | 5.42  | 5.38  | 4.94  | 5.37  | 5.61  | 5.56  | 5.22  | 5.19  |
| Al2O3 | 12.1  | 12.1  | 12.0  | 11.7  | 12.0  | 12.2  | 12.0  | 12.2  | 12.9  |
| FeO | 11.7  | 12.1  | 12.2  | 13.6  | 11.9  | 11.4  | 12.0  | 12.2 | 12.0  |
| Cr2O3 | 0.02  | 0.00  | 0.02  | 0.01  | 0.01  | 0.01  | 0.00  | 0.00  | 0.07  |
| MnO | 0.13  | 0.16  | 0.15  | 0.23  | 0.14  | 0.13  | 0.12  | 0.15  | 0.14  |
| MgO | 12.5  | 12.8  | 12.6  | 12.6 | 12.5  | 13.0  | 12.5  | 12.7  | 13.6  |
| CaO | 11.6  | 11.5  | 11.5  | 11.4  | 11.7  | 11.6  | 11.5  | 11.7  | 11.7 |
| Na2O | 2.47  | 2.45  | 2.38  | 2.52  | 2.46  | 2.45  | 2.35  | 2.43  | 2.20  |
| K2O | 0.93  | 0.66  | 0.69  | 0.53  | 0.70  | 0.69  | 0.68  | 0.72  | 0.70  |
| H2O | 1.18 | 1.10 | 1.12 | 1.12 | 1.16 | 1.10 | 1.10 | 1.14 | 1.05 |
| Total | 98.2 | 98.2 | 98.3 | 98.0 | 99.0 | 98.6 | 98.3 | 98.9 | 98.3 |
| 以23个O原子为基础计算的离子数 |
| Si | 6.06  | 6.00  | 6.06  | 5.95  | 6.10  | 6.04  | 6.08  | 6.03  | 5.82  |
| AlIV | 1.94  | 2.01  | 1.95  | 2.08  | 1.89  | 1.97  | 1.93  | 1.97  | 2.20  |
| AlVI | 0.22  | 0.15  | 0.18  | 0.03  | 0.23  | 0.19  | 0.21  | 0.19  | 0.10  |
| Ti | 0.60  | 0.63  | 0.62  | 0.59  | 0.60  | 0.64  | 0.63  | 0.60  | 0.62  |
| Fe3+ | 0.30  | 0.38  | 0.36  | 0.53  | 0.29  | 0.32  | 0.32  | 0.36  | 0.48  |
| Fe2+ | 1.06  | 0.98  | 1.03  | 1.01  | 1.08  | 0.96  | 1.05  | 1.02  | 0.80  |
| Mn | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.01  | 0.00  | 0.01  | 0.00  |
| Mg | 2.78  | 2.81  | 2.77  | 2.77  | 2.76  | 2.85  | 2.75  | 2.79  | 2.96  |
| Ca | 1.88  | 1.86  | 1.85  | 1.86  | 1.88  | 1.87  | 1.85  | 1.87  | 1.89  |
| Na | 0.72  | 0.72  | 0.70  | 0.75  | 0.72  | 0.71  | 0.69  | 0.71  | 0.65  |
| K | 0.18  | 0.13  | 0.14  | 0.11  | 0.14  | 0.14  | 0.13  | 0.14  | 0.14  |
| Total | 15.7  | 15.7  | 15.7  | 15.7  | 15.7  | 15.7  | 15.6  | 15.7  | 15.7  |

续表2-3

**Table 2-3 (continued)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| WJL-11 | WJL-11 | WJL-11 | DW10-2\* | DW10-2\* | DW32-2\* | DW32-2\* | WJL19-1\* | WJL19-1\* | WJL20-1\* |
| 16-边 | 17 | 22 | 1 | 2 | 1 | 2 | 1 | 2 | 1 |
| 40.0 | 40.4 | 39.9 | 43.41 | 42.91 | 42.9 | 42.69 | 42.6 | 42.64 | 43.44 |
| 5.46 | 5.26 | 5.54 | 4.17 | 7.26 | 8.98 | 4.71 | 3.86 | 4.51 | 5.28 |
| 12.2 | 12.0 | 12.1 | 11.9 | 9.3 | 10.4 | 10.0 | 11.7 | 10.9 | 11.7 |
| 12.1 | 11.9 | 11.9 | 16.1 | 14.9 | 12.8 | 13.6 | 18.5 | 15.6 | 13.8 |
| 0.04 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.15 | 0.15 | 0.14 | 0.17 | 0.17 | 0.15 | 0.22 | 0.67 | 0.22 | 0.25 |
| 12.6 | 12.6 | 12.7 | 11.2 | 10.5 | 10.7 | 11.3 | 7.70 | 10.6 | 10.9 |
| 11.67 | 11.6 | 11.5 | 9.33 | 10.3 | 10.5 | 9.82 | 10.1 | 10.3 | 9.93 |
| 2.32 | 2.41 | 2.45 | 3.09 | 30.7 | 2.97 | 5.87 | 3.42 | 3.45 | 3.75 |
| 0.69 | 0.68 | 0.66 | 0.88 | 1.42 | 0.54 | 1.48 | 1.42 | 1.32 | 1.26 |
| 1.10 | 1.17 | 1.09 | 1.20 | 2.41 | 0.63 | 1.49 | 1.43 | 1.31 | 1.22 |
| 98.7 | 98.4 | 98.3 | 101.9 | 129.9 | 100.6 | 101.4 | 101.8 | 101.2 | 101.8 |
| 以23个O原子为基础计算的离子数 |
| 6.03 | 6.09 | 6.03 | 6.37 | 6.43 | 6.38 | 6.34 | 6.38 | 6.35 | 6.38 |
| 1.97 | 1.92 | 1.98 | 1.62 | 1.51 | 1.56 | 1.61 | 1.58 | 1.62 | 1.57 |
| 0.20 | 0.22 | 0.18 | 0.43 | 0.13 | 0.26 | 0.14 | 0.47 | 0.30 | 0.46 |
| 0.62 | 0.60 | 0.63 | 0.45 | 0.75 | 0.96 | 0.46 | 0.40 | 0.47 | 0.54 |
| 0.34 | 0.32 | 0.35 | 0.45 | 0.22 | 0.06 | 0.32 | 0.48 | 0.36 | 0.26 |
| 1.02 | 1.04 | 0.99 | 1.28 | 1.54 | 1.36 | 1.46 | 1.83 | 1.50 | 1.35 |
| 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 |
| 2.78 | 2.77 | 2.80 | 2.36 | 2.33 | 2.34 | 2.50 | 1.72 | 2.33 | 2.37 |
| 1.87 | 1.86 | 1.85 | 1.47 | 1.66 | 1.66 | 1.57 | 1.62 | 1.65 | 1.56 |
| 0.68 | 0.70 | 0.72 | 0.70 | 0.68 | 0.72 | 1.06 | 0.60 | 0.72 | 0.72 |
| 0.14 | 0.13 | 0.13 | 0.17 | 0.27 | 0.10 | 0.27 | 0.27 | 0.25 | 0.23 |
| 15.7 | 15.7 | 15.7 | 15.3 | 15.5 | 15.4 | 15.7 | 15.4 | 15.6 | 15.4 |

带\*样品数据引自王璐（2014）附表2-4瓦吉里塔格碱性煌斑岩中云母成分

**Table 2-4 EMPA analysis of micas in the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | BC-4 | BC-4 | BC-4 | BC-4 | BC-4 | DW10-2\* | DW10-2\* | DW14-1\* | DW14-1\* |
| 位置 | 1-基质 | 2-基质 | 3-核 | 4-核 | 5-核 | 1 | 2 | 1 | 2 |
| SiO2(%) | 39.0 | 37.7 | 38.4 | 37.1 | 39.2 | 37.74 | 36.84 | 36.49 | 37.26 |
| TiO2 | 4.22 | 4.59 | 4.02 | 3.90 | 3.88 | 4.8 | 5.86 | 6.02 | 4.3 |
| Al2O3 | 12.5 | 12.8 | 12.9 | 13.1 | 13.3 | 13.4 | 14.0 | 13.4 | 14.1 |
| FeO | 18.0 | 18.4 | 16.9 | 17.1 | 16.9 | 11.5 | 14.4 | 13.8 | 11.1 |
| MnO | 0.07 | 0.16 | 0.09 | 0.10 | 0.11 | 0.06 | 0.33 | 0.26 | 0.14 |
| MgO | 13.3 | 12.6 | 14.2 | 13.7 | 13.6 | 17.3 | 15.3 | 15.0 | 18.5 |
| CaO | 0.03 | 0.03 | 0.00 | 0.00 | 0.02 | 0.54 | 0.05 | 0.05 | 0.04 |
| Na2O | 0.21 | 0.32 | 0.15 | 0.22 | 0.17 | 0.48 | 0.26 | 0.42 | 0.48 |
| K2O | 9.25 | 9.53 | 9.31 | 9.01 | 7.78 | 9.35 | 9.27 | 9.03 | 9.26 |
| F | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cl | 0.37 | 0.33 | 0.26 | 0.27 | 0.28 | 0.00 | 0.00 | 0.00 | 0.00 |
| H2O | 2.78 | 2.69 | 2.88 | 2.84 | 2.77 | 2.40 | 2.48 | 2.33 | 2.76 |
| Total | 100.7  | 100.3  | 100.2  | 98.3  | 99.0  | 98.4  | 100.1  | 98.0  | 98.7  |
| 以12个氧原子(电子探针数据以11个氧原子)和 8 个阳离子为基准 |  |
| Si | 2.90 | 2.84 | 2.87 | 2.83 | 2.92 | 2.83 | 2.79 | 2.81 | 2.79 |
| AlⅣ | 1.09 | 1.13 | 1.13 | 1.17 | 1.08 | 1.19 | 1.18 | 1.15 | 1.17 |
| AlⅥ | 0.00 | 0.00 | 0.00 | 0.01 | 0.09 | 0.00 | 0.07 | 0.07 | 0.08 |
| Ti | 0.24 | 0.26 | 0.23 | 0.22 | 0.22 | 0.27 | 0.32 | 0.34 | 0.24 |
| Fe3+ | 0.26 | 0.21 | 0.22 | 0.21 | 0.36 | 0.17 | 0.18 | 0.17 | 0.20 |
| Fe2+ | 0.86 | 0.96 | 0.83 | 0.88 | 0.70 | 0.54 | 0.71 | 0.68 | 0.45 |
| Mn | 0.00 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.02 | 0.02 | 0.01 |
| Mg | 1.48 | 1.42 | 1.58 | 1.55 | 1.51 | 1.82 | 1.71 | 1.71 | 2.04 |
| Ca | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 |
| Na | 0.03 | 0.05 | 0.02 | 0.03 | 0.02 | 0.07 | 0.04 | 0.06 | 0.07 |
| K | 0.88 | 0.92 | 0.89 | 0.88 | 0.74 | 0.95 | 0.91 | 0.90 | 0.89 |
| Total | 7.74 | 7.79 | 7.78 | 7.79 | 7.64 | 7.90 | 7.93 | 7.91 | 7.93 |

带\*样品数据引自王璐（2014）附表2-5瓦吉里塔格碱性煌斑岩中斜长石成分

**Table 2-5 EMPA analysis of plagioclases in the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | WJL-11 | WJL-16 | WJL-17 | WJL-18 | WJL-19 | WJL-20 | WJL-20 | DW10-2\* | DW10-2\* | DW14-2\* | DW32-2\* | DW2010-2\* |
| 位置 | 1 | 1 | 2 | 3 | 4 | 1 | 2 | 1 | 2 | 2 | 2 | 2 |
|  | 基质 | 基质 | 基质 | 核 | 基质 | 核 | 核 |  |  |  |  |  |
| SiO2(%) | 73.1 | 59.1 | 62.5 | 56.4 | 65.1 | 54.6 | 54.6 | 64.9 | 64.9 | 65.2 | 67.9 | 68.5 |
| TiO2 | 0.00 | 0.09 | 0.02 | 0.10 | 0.04 | 0.12 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Al2O3 | 21.6 | 25.3 | 25.8 | 28.0 | 22.8 | 28.4 | 28.5 | 22.3 | 22.8 | 20.8 | 20.3 | 21.7 |
| FeO | 0.51 | 0.50 | 0.33 | 0.53 | 0.38 | 0.84 | 0.64 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MgO | 0.07 | 0.04 | 0.01 | 0.05 | 0.00 | 0.16 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MnO | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| CaO | 0.64 | 7.57 | 6.88 | 10.7 | 3.80 | 7.37 | 11.9 | 2.84 | 2.49 | 1.63 | 1.63 | 1.72 |
| Na2O | 4.72 | 6.27 | 5.67 | 4.33 | 0.00 | 4.26 | 4.59 | 10.2 | 10.3 | 11.2 | 10.6 | 8.81 |
| K2O | 0.22 | 0.76 | 0.80 | 0.35 | 2.51 | 2.68 | 0.31 | 0.17 | 0.33 | 0.15 | 0.22 | 0.26 |
| Total | 100.9 | 99.6 | 102.0 | 100.5 | 100.9 | 98.4 | 100.7 | 100.4 | 100.8 | 99.0 | 100.6 | 100.9 |
| 以8个O原子为基础计算的离子数 |
| Si | 3.07 | 2.65 | 2.71 | 2.52 | 2.85 | 2.51 | 2.46 | 2.85 | 2.84 | 2.90 | 2.96 | 2.95 |
| Ti | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Al | 1.07 | 1.34 | 1.32 | 1.47 | 1.18 | 1.54 | 1.51 | 1.15 | 1.17 | 1.09 | 1.04 | 1.10 |
| Fe2+ | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mg | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ca | 0.03 | 0.36 | 0.32 | 0.51 | 0.18 | 0.36 | 0.57 | 0.13 | 0.12 | 0.08 | 0.08 | 0.08 |
| Na | 0.38 | 0.55 | 0.48 | 0.38 | 0.53 | 0.38 | 0.40 | 0.87 | 0.87 | 0.96 | 0.89 | 0.74 |
| K | 0.01 | 0.04 | 0.04 | 0.02 | 0.14 | 0.16 | 0.02 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 |
| Total | 4.59 | 4.97 | 4.89 | 4.93 | 4.89 | 4.99 | 4.99 | 5.01 | 5.02 | 5.04 | 4.98 | 4.88 |
| TotalO. | 3.17 | 2.97 | 3.07 | 2.98 | 3.04 | 2.90 | 2.96 | 3.03 | 3.04 | 2.99 | 3.06 | 3.09 |
| An | 6.8 | 38.2 | 38.0 | 56.5 | 21.0 | 40.3 | 57.8 | 13.2 | 11.6 | 7.4 | 7.7 | 9.6 |
| Ab | 90.5 | 57.3 | 56.7 | 41.3 | 62.5 | 42.2 | 40.4 | 85.9 | 86.6 | 91.8 | 91.0 | 88.7 |
| Or | 2.7 | 4.5 | 5.2 | 2.2 | 16.5 | 17.5 | 1.8 | 0.9 | 1.8 | 0.8 | 1.2 | 1.7 |

带\*样品数据引自王璐（2014）附表2-6瓦吉里塔格碱性煌斑岩中磷灰石成分

**Table 2-6 EMPA analysis of apatites in the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | WJL-11-19 | WJL-11-21 | WJL-11-23 | WJL-11-24 | WJL-11-25 | WJL-11-26 | WJL-11-27 | WJL-16 |
| P2O5(%) | 42.8 | 42.6 | 42.5 | 42.8 | 42.5 | 42.3 | 42.9 | 42.6 |
| F | 1.77 | 1.73 | 2.08 | 1.87 | 1.91 | 1.55 | 1.99 | 1.64 |
| Cl | 0.19 | 0.21 | 0.22 | 0.22 | 0.19 | 0.22 | 0.20 | 0.22 |
| Na2O | 0.03 | 0.05 | 0.07 | 0.07 | 0.05 | 0.07 | 0.04 | 0.06 |
| FeO | 0.30 | 0.31 | 0.33 | 0.33 | 0.31 | 0.30 | 0.32 | 0.30 |
| MgO | 0.32 | 0.36 | 0.33 | 0.31 | 0.34 | 0.32 | 0.33 | 0.31 |
| MnO | 0.04 | 0.04 | 0.05 | 0.06 | 0.04 | 0.06 | 0.04 | 0.06 |
| CaO | 53.1 | 53.1 | 53.1 | 53.0 | 53.1 | 53.3 | 53.2 | 53.4 |
| Total | 97.7 | 97.5 | 97.7 | 97.8 | 97.6 | 97.4 | 98.0 | 97.9 |

附表3瓦吉里塔格碱性煌斑岩主量和微量元素分析结果

**Table 3 Major and trace elements of the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | BC-1 | BC-2 | BC-3 | BC-4 | BC-5 | BC-20 | BC-28 | BC-29 | BC-30 | BC-31 | BC-32 | WJL-7 |
| GPS | N39º33´04";E78º55´30" | N39º32´56"; E78º56´02" | N39º34´09"; E78º54´32" |
| 主量元素(%) |
| SiO2 | 49.1  | 49.0  | 49.4  | 49.0  | 48.3  | 45.1  | 45.0  | 45.4  | 45.8  | 45.5  | 44.9  | 49.1 |
| TiO2 | 3.35  | 3.41  | 3.30  | 3.40  | 3.49  | 3.69  | 3.82  | 3.91  | 4.04  | 3.95  | 3.73  | 2.44 |
| Al2O3 | 13.1  | 13.2  | 13.3  | 12.9  | 12.8  | 11.9  | 11.7  | 12.0  | 12.8  | 11.9  | 12.0  | 15.8 |
| Fe2O3 | 13.0  | 13.2  | 12.8  | 13.1  | 13.4  | 14.0  | 14.5  | 14.6  | 14.8  | 14.9  | 14.0  | 9.7 |
| MnO | 0.17  | 0.18  | 0.17  | 0.17  | 0.18  | 0.21  | 0.17  | 0.17  | 0.17  | 0.18  | 0.17  | 0.15 |
| MgO | 5.66  | 5.84  | 5.50  | 5.91  | 6.05  | 7.14  | 6.80  | 6.63  | 5.76  | 6.73  | 6.06  | 3.88 |
| CaO | 7.99  | 8.11  | 7.69  | 8.35  | 8.35  | 10.78  | 8.55  | 8.41  | 8.01  | 8.52  | 8.27  | 5.98 |
| Na2O | 3.32  | 3.19  | 3.40  | 3.04  | 3.10  | 3.07  | 3.90  | 3.99  | 4.16  | 3.87  | 4.49  | 5.06 |
| K2O | 2.37  | 2.30  | 2.40  | 2.38  | 2.28  | 1.56  | 1.67  | 1.49  | 1.59  | 1.19  | 1.74  | 2.70 |
| P2O5 | 0.65  | 0.67  | 0.66  | 0.66  | 0.67  | 0.57  | 0.67  | 0.68  | 0.76  | 0.67  | 0.69  | 0.89 |
| LOI | 0.20  | 1.00  | 0.40  | 0.40  | 1.20  | 1.60  | 2.99  | 2.19  | 1.99  | 2.17  | 3.13  | 3.78 |
| Total | 98.9  | 100.0  | 99.1  | 99.3  | 99.8  | 99.6  | 99.8  | 99.5  | 99.8  | 99.5  | 99.3  | 99.4 |
| Mg# | 49.0  | 49.4  | 48.6  | 49.8  | 49.9  | 52.9  | 50.8  | 49.9  | 46.2  | 49.9  | 48.8  | 46.9  |
| 微量元素(×10-6) |
| V | 260  | 258  | 249  | 268  | 265  | 332  | 288  | 297  | 293  | 310  | 287  | 397 |
| Cr | 130  | 137  | 124  | 142  | 147  | 172  | 143  | 160  | 132  | 179  | 141  | 21 |
| Ni | 69.8  | 84.4  | 71.9  | 75.9  | 76.7  | 74.1  | 98.9  | 102.5  | 88.6  | 108.3  | 89.6  | 22.1 |
| Ga | 24.0  | 24.1  | 23.9  | 23.9  | 23.4  | 21.7  | 22.7  | 23.5  | 24.3  | 23.7  | 23.5  | 26.2 |
| Rb | 53.8  | 53.2  | 54.8  | 54.4  | 46.7  | 52.5  | 34.8  | 34.8  | 37.9  | 34.1  | 37.5  | 40.0 |
| Sr | 775  | 774  | 765  | 780  | 759  | 743  | 865  | 870  | 911  | 861  | 1022  | 1079 |
| Y | 31.3 | 31.7 | 31.9 | 31.8 | 31.7 | 28.1 | 31.1 | 32.2 | 32.9 | 32.0 | 36.2 | 37.7 |
| Zr | 342  | 348  | 365  | 341  | 342  | 319  | 349  | 374  | 357  | 370  | 381  | 491 |
| Nb | 59.9  | 59.3  | 61.2  | 59.1  | 57.2  | 61.8  | 58.2  | 60.6  | 64.0  | 60.7  | 74.6  | 85.2 |
| Ba | 765  | 802  | 798  | 765  | 779  | 666  | 923  | 778  | 808  | 649  | 1129  | 1025 |
| La | 59.9  | 59.1  | 65.2  | 58.9  | 58.1  | 55.0  | 57.4  | 58.9  | 67.2  | 57.9  | 60.3  | 82.0 |
| Ce | 126  | 124  | 133  | 124  | 122  | 118  | 119  | 123  | 139  | 123  | 127  | 180 |
| Pr | 16.0  | 15.5  | 16.6  | 15.7  | 15.5  | 14.9  | 15.4  | 15.7  | 17.2  | 15.9  | 16.0  | 21.1 |
| Nd | 63.7  | 63.5  | 65.8  | 63.0  | 62.2  | 60.4  | 62.2  | 64.2  | 70.0  | 64.7  | 66.2  | 82.2 |
| Sm | 12.0  | 11.9  | 12.1  | 11.9  | 11.9  | 11.1  | 11.8  | 12.1  | 12.7  | 12.3  | 13.1  | 15.0 |
| Eu | 3.46  | 3.38  | 3.52  | 3.51  | 3.49  | 3.23  | 3.47  | 3.57  | 3.83  | 3.66  | 4.00  | 5.00 |
| Gd | 9.94  | 10.1  | 10.2  | 10.1 | 9.93  | 9.33  | 9.96  | 10.2  | 10.7  | 10.4  | 11.2  | 15.6 |
| Tb | 1.34  | 1.35  | 1.35  | 1.36  | 1.36  | 1.20  | 1.33  | 1.37  | 1.42  | 1.38  | 1.53  | 1.77 |
| Dy | 6.94  | 6.75  | 6.86  | 6.87  | 6.85  | 6.05  | 6.71  | 6.84  | 7.12  | 7.07  | 7.75  | 8.27 |
| Ho | 1.21  | 1.23  | 1.25  | 1.24  | 1.23  | 1.08  | 1.19  | 1.21  | 1.25  | 1.22  | 1.35  | 1.50 |
| Er | 2.98  | 2.98  | 3.05  | 3.01  | 3.02  | 2.64  | 2.83  | 2.89  | 3.04  | 2.94  | 3.31  | 3.92 |
| Tm | 0.36  | 0.36  | 0.37  | 0.37  | 0.37  | 0.32  | 0.34  | 0.35  | 0.36  | 0.36  | 0.41  | 0.43 |
| Yb | 2.19  | 2.18  | 2.24  | 2.14  | 2.15  | 1.91  | 2.01  | 2.10  | 2.13  | 2.12  | 2.43  | 2.64 |
| Lu | 0.31  | 0.31  | 0.32  | 0.31  | 0.30  | 0.27  | 0.29  | 0.29  | 0.30  | 0.30  | 0.35  | 0.36 |
| Hf | 8.97  | 8.93  | 9.54  | 8.87  | 8.98  | 8.40  | 8.91  | 9.35  | 9.04  | 9.25  | 9.45  | 11.6 |
| Ta | 3.55  | 3.48  | 3.73  | 3.50  | 3.39  | 3.56  | 3.37  | 3.45  | 3.68  | 3.55  | 3.49  | 4.64 |
| Pb | 8.74  | 8.02  | 7.59  | 8.91  | 7.64  | 13.2  | 10.1  | 11.1  | 11.3  | 7.24  | 10.4  | 4.51 |
| Th | 8.11  | 7.01  | 7.98  | 7.93  | 6.99  | 6.33  | 5.63  | 6.00  | 6.24  | 5.83  | 9.74  | 7.73 |
| U | 1.84  | 1.77  | 1.99  | 1.91  | 1.75  | 1.49  | 1.47  | 1.55  | 1.63  | 1.54  | 1.46  | 1.27 |

续附表3

**Table 3 (Continued)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | WJL-11 | WJL-14 | WJL-16 | WJL-20 | BC-21 | DW10-2\* | DW14-1\* | DW14-2\* | DW32-2\* | DW2010-2\* | WJL-20-1\* | WJL-19-1\* |
| GPS | N39º34´09"; E78º54´32" | N39º34´08"; E78º54´33" | N39º34´06"; E78º54´32" | N39º34´05"; E78º54´40" | N39º32´55"; E78º55´10" |  |  |  |  |  |  |  |
| 主量元素(%) |
| SiO2 | 48.9 | 49.1 | 43.5 | 44.4 | 47.6 | 44.98 | 43.7 | 44.22 | 43.32 | 45.95 | 43.3 | 41.51 |
| TiO2 | 2.29 | 2.28 | 4.58 | 4.34 | 3.80 | 3.9 | 3.8 | 3.8 | 4.1 | 3.5 | 4.7 | 4.8 |
| Al2O3 | 16.0 | 15.8 | 11.6 | 11.9 | 14.5 | 14.0 | 14.2 | 14.0 | 13.9 | 14.4 | 12.1 | 12.3 |
| Fe2O3 | 9.5 | 9.3 | 15.0 | 15.5 | 13.4 | 11.5 | 12.2 | 12.0 | 12.2 | 11.1 | 15.4 | 14.2 |
| MnO | 0.16 | 0.15 | 0.17 | 0.18 | 0.20 | 0.17 | 0.21 | 0.24 | 0.15 | 0.13 | 0.19 | 0.21 |
| MgO | 3.57 | 3.73 | 5.73 | 7.29 | 4.70 | 4.4 | 5.0 | 4.6 | 5.9 | 3.8 | 5.5 | 5.8 |
| CaO | 6.25 | 6.05 | 9.31 | 8.72 | 8.80 | 8.52 | 8.54 | 9.32 | 9.48 | 7.91 | 8.85 | 10.1 |
| Na2O | 5.50 | 5.42 | 2.58 | 2.79 | 3.6 | 5.56 | 4.98 | 6.04 | 4.30 | 5.34 | 3.25 | 3.35 |
| K2O | 2.07 | 2.55 | 1.79 | 1.80 | 1.60 | 2.96 | 2.21 | 1.43 | 1.18 | 2.09 | 2.37 | 2.71 |
| P2O5 | 0.90 | 0.91 | 0.62 | 0.62 | 0.80 | 0.99 | 1.09 | 0.92 | 0.76 | 1.02 | 0.63 | 1.06 |
| LOI | 3.89 | 3.98 | 4.92 | 2.37 | 0.40 | 1 | 4 | 3 | 5 | 4 | 3 | 3 |
| Total | 99.0 | 99.3 | 99.8 | 99.8 | 99.3 | 98.3 | 99.5 | 99.6 | 100.5 | 99.4 | 99.0 | 98.9 |
| Mg# | 45.2  | 46.8  | 45.6  | 50.9  | 43.6  | 45.5  | 47.4  | 45.8  | 51.8  | 43.3  | 44.1  | 47.3  |
| 微量元素(×10-6) |
| V | 374 | 386 | 868 | 613 |  | 253 | 214 | 250 | 316 | 205 | 379 | 330 |
| Cr | 16 | 14 | 76 | 176 |  | 6.23 | 77.5 | 41.6 | 117.0 | 4.68 | 50.0 | 48.3 |
| Ni | 15.8 | 14.0 | 79.2 | 109.4 |  | 25.5 | 40.1 | 31.1 | 83.1 | 2.65 | 69.1 | 65.8 |
| Ga | 27.1 | 27.0 | 24.0 | 23.9 |  | 28.6 | 27.5 | 26.9 | 24.4 | 26.7 | 25.3 | 26.4 |
| Rb | 23.0 | 32.1 | 33.3 | 47.3 |  | 75.9 | 49.1 | 56.5 | 22.0 | 46.7 | 35.0 | 61.4 |
| Sr | 933 | 986 | 717 | 742 |  | 1285 | 1554 | 1794 | 1051 | 942 | 761 | 1003 |
| Y | 37.4 | 37.5 | 33.0 | 32.3 |  | 39.6 | 45.6 | 41.5 | 32.3 | 40.2 | 33.8 | 37.9 |
| Zr | 494 | 494 | 362 | 359 |  | 540 | 518 | 524 | 363 | 435 | 359 | 482 |
| Nb | 85.4 | 84.0 | 53.3 | 55.8 |  | 85.4 | 91.6 | 115 | 55 | 63.6 | 54 | 87.2 |
| Ba | 752 | 764 | 562 | 608 |  | 1254 | 903 | 1962 | 490 | 660 | 1962 | 994 |
| La | 82.3 | 79.3 | 50.4 | 51.6 |  | 96.8 | 97.2 | 101 | 57.1 | 68.5 | 51.6 | 86.2 |
| Ce | 181 | 179 | 114 | 116 |  | 204 | 205 | 206 | 124 | 149 | 112 | 184 |
| Pr | 21.6 | 20.8 | 14.2 | 14.4 |  | 24.5 | 27.0 | 25.8 | 15.5 | 18.7 | 14.3 | 22.6 |
| Nd | 83.2 | 79.9 | 57.6 | 57.6 |  | 100 | 114 | 108 | 66.2 | 81.1 | 63.2 | 97.6 |
| Sm | 15.0 | 14.9 | 11.6 | 11.7 |  | 17.9 | 20.8 | 19.2 | 12.5 | 15.3 | 12.7 | 17.4 |
| Eu | 4.77 | 4.86 | 3.72 | 3.82 |  | 5.06 | 6.41 | 5.68 | 3.87 | 4.56 | 3.73 | 5.22 |
| Gd | 15.52 | 15.50 | 11.90 | 11.86 |  | 14.2 | 16.7 | 15.4 | 10.5 | 13.2 | 10.7 | 14.0 |
| Tb | 1.78 | 1.78 | 1.45 | 1.44 |  | 1.80 | 2.17 | 1.94 | 1.46 | 1.74 | 1.42 | 1.80 |
| Dy | 8.32 | 8.24 | 7.32 | 7.12 |  | 8.93 | 10.7 | 9.29 | 7.13 | 8.99 | 7.51 | 8.68 |
| Ho | 1.50 | 1.50 | 1.34 | 1.29 |  | 1.49 | 1.79 | 1.60 | 1.24 | 1.54 | 1.28 | 1.44 |
| Er | 3.95 | 3.93 | 3.37 | 3.30 |  | 3.72 | 4.41 | 3.87 | 3.15 | 3.81 | 3.16 | 3.53 |
| Tm | 0.44 | 0.43 | 0.38 | 0.37 |  | 0.48 | 0.60 | 0.55 | 0.44 | 0.55 | 0.44 | 0.45 |
| Yb | 2.66 | 2.62 | 2.33 | 2.23 |  | 2.75 | 3.23 | 3.08 | 2.29 | 2.92 | 2.53 | 2.49 |
| Lu | 0.36 | 0.36 | 0.32 | 0.31 |  | 0.38 | 0.41 | 0.39 | 0.32 | 0.39 | 0.34 | 0.34 |
| Hf | 11.8 | 11.7 | 9.06 | 8.98 |  | 12.5 | 12.5 | 12.4 | 8.4 | 10.1 | 8.91 | 11.3 |
| Ta | 4.66 | 4.70 | 3.19 | 3.28 |  | 5.88 | 6.56 | 6.56 | 3.82 | 4.51 | 3.90 | 6.08 |
| Pb | 4.89 | 4.16 | 4.77 | 2.82 |  | 16.2 | 9.62 | 44.9 | 4.90 | 2.07 | 20.3 | 6.59 |
| Th | 8.55 | 7.72 | 10.3 | 4.71 |  | 12.7 | 9.13 | 14.0 | 6.06 | 7.58 | 6.09 | 10.5 |
| U | 1.31 | 1.81 | 0.91 | 0.69 |  | 2.62 | 2.57 | 2.76 | 1.33 | 1.72 | 1.34 | 2.33 |

带\*样品数据引自王璐（2014）

附表4瓦吉里塔格碱性煌斑岩Sr-Nd-Pb同位素

**Table 4 Sr-Nd-Pb isotopes of the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | 87Rb/86Sr | 87Sr/86Sr | 2σ | (87Sr/86Sr)i | 147Sm/144Nd | 143Nd/144Nd | 2σ | TDM(Ga) | (143Nd/144Nd)i | εNd(t) |
| BC-1 | 0.20  | 0.70614  | 10  | 0.70534  | 0.1137  | 0.51241  | 9  | 1.13  | 0.512203  | -1.55  |
| BC-2 | 0.20  | 0.70605  | 13  | 0.70526  | 0.1132  | 0.51239  | 8  | 1.15  | 0.512186  | -1.88  |
| BC-20 | 0.20  | 0.70590  | 11  | 0.70508  | 0.1111  | 0.51246  | 7  | 1.03  | 0.512251  | -0.60  |
| BC-28 | 0.12  | 0.70507  | 13  | 0.70461  | 0.1142  | 0.51253  | 8  | 0.96  | 0.512317  | 0.68  |
| BC-30 | 0.12  | 0.70484  | 11  | 0.70436  | 0.1093  | 0.51253  | 8  | 0.91  | 0.512330  | 0.93  |
| BC-32 | 0.11  | 0.70505  | 11  | 0.70462  | 0.1194  | 0.51256  | 8  | 0.96  | 0.512338  | 1.10  |
| DW10-2\* | 0.18  | 0.70582 |  | 0.705140  | 0.1077  | 0.512431  |  | 1.04  | 0.512239  | -0.95  |
| DW14-1\* | 0.09  | 0.7039 |  | 0.703539  | 0.1108  | 0.512774  |  | 0.56  | 0.512577  | 5.64  |
| DW14-2\* | 0.09  | 0.70478 |  | 0.704422  | 0.1095  | 0.512490  |  | 0.97  | 0.512295  | 0.14  |
| DW32-2\* | 0.06  | 0.70447 |  | 0.704231  | 0.1152  | 0.512638  |  | 0.79  | 0.512433  | 2.83  |
| DW10-2\* | 0.15  | 0.70527 |  | 0.704705  | 0.1164  | 0.512572  |  | 0.91  | 0.512365  | 1.50  |
| WJL20-1\* | 0.13  | 0.70562 |  | 0.705100  | 0.1197  | 0.512614  |  | 0.87  | 0.512401  | 2.21  |
| WJL19-1\* | 0.18  | 0.70468 | 　 | 0.703980  | 0.1104  | 0.512586  | 　 | 0.83  | 0.512389  | 1.98  |

带\*样品数据引自王璐（2014）

续附表4

**Table 4 (Continued)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品 | U | Th | Pb | 208Pb/204Pb | 207Pb/204Pb | 206Pb/204Pb | (208Pb/204Pb)i | (207Pb/204Pb)i | (206Pb/204Pb)i |
| BC-1 | 1.843 | 8.108 | 8.736 | 38.4053 | 15.4533 | 17.79940  | 37.561  | 15.423  | 17.211  |
| BC-2 | 1.766 | 7.007 | 8.019 | 38.3812 | 15.4612 | 17.80620  | 37.586  | 15.429  | 17.192  |
| BC-20 | 1.485 | 6.331 | 13.22 | 38.6339 | 15.5838 | 18.20940  | 38.634  | 15.584  | 17.893  |
| BC-28 | 1.465 | 5.631 | 10.09 | 38.5225 | 15.5296 | 18.21930  | 38.010  | 15.508  | 17.811  |
| BC-30 | 1.63 | 6.237 | 11.3 | 38.4197 | 15.5105 | 18.11700  | 37.915  | 15.490  | 17.713 |
| BC-32 | 1.462 | 9.737 | 10.38 | 38.8831 | 15.5362 | 18.26860  | 38.017  | 15.516  | 17.870  |

附表5瓦吉里塔格碱性煌斑岩Mg同位素

**Table 5 Mg isotopes of the Wajilitag alkaline lamprophyres**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 样品 | δ26Mg (‰) | 2SD | δ25Mg (‰) | 2SD |
| BC-1 | -0.57 | 0.02 | -0.28 | 0.01 |
| WJL-16 | -0.78 | 0.01 | -0.38 | 0.02 |
| WJL-14 | -0.68 | 0.01 | -0.34 | 0.01 |
| WJL-14 | -0.71 | 0.06 | -0.37 | 0.06 |
| BHVO-2 | -0.26 | 0.03 | -0.13 | 0.04 |
| JB-2 | -0.18 | 0.01 | -0.09 | 0.02 |