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 |