附表1点苍山-哀牢山构造带斜长角闪岩主量元素(%)、微量元素(10-6)分析测结果

Table 1 Major element (%) and trace element (10-6) compositions of the Neoproterozoic amphibolite in the Diancangshan-Ailaoshan tectonic belt

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 样品号 | 第1组 | | 第2组 | | | 哀牢山群阿龙组 | | | | | | | | | | | |
| 16MH32 | 16MH33 | 16MH34 | 16MH35 | 16MH36 | 1\* | 2\* | 3\* | 4\* | 5\* | 6\* | 7\* | 8\* | 9\* | 10\* | 11\* | 12\* |
| SiO2 | 52.4 | 52.6 | 47.5 | 47.5 | 47.4 | 48.6 | 47.3 | 51.5 | 49.3 | 47.6 | 47.1 | 50.9 | 48.6 | 49 | 48.9 | 46.8 | 46.9 |
| TiO2 | 1.10 | 1.10 | 0.90 | 0.80 | 0.80 | 1.80 | 2.20 | 0.40 | 0.50 | 0.70 | 0.80 | 0.60 | 1.70 | 1.70 | 1.80 | 2.20 | 2.20 |
| Al2O3 | 19.0 | 19.3 | 18.1 | 18.2 | 18.2 | 11.9 | 14.4 | 15.2 | 14.6 | 14.4 | 13.2 | 14.8 | 10.8 | 10.8 | 12.0 | 14.4 | 14.5 |
| Fe2O3 | 8.5 | 8.5 | 9.6 | 9.6 | 9.5 | 12.9 | 14.5 | 7.9 | 8.1 | 9.0 | 9.9 | 8.8 | 12.6 | 12.9 | 13.1 | 14.6 | 14.5 |
| MgO | 4.1 | 4.2 | 5.4 | 5.5 | 5.4 | 10.1 | 6.8 | 8.8 | 11.0 | 11.5 | 12.1 | 9.2 | 11.3 | 11.6 | 10.0 | 7.0 | 7.0 |
| CaO | 4.6 | 4.6 | 7.4 | 7.4 | 7.5 | 10.7 | 11.6 | 12.5 | 12.6 | 12.9 | 13.6 | 11.1 | 10.7 | 10.0 | 10.3 | 12.0 | 11.9 |
| K2O | 1.7 | 1.7 | 2.0 | 2.0 | 2.0 | 0.2 | 0.6 | 0.8 | 0.8 | 0.8 | 0.6 | 0.8 | 0.2 | 0.2 | 0.3 | 0.5 | 0.5 |
| Na2O | 5.4 | 5.4 | 5.4 | 5.4 | 5.3 | 2.0 | 1.2 | 2.4 | 2.4 | 2.2 | 2.2 | 2.9 | 1.5 | 1.5 | 2.0 | 1.2 | 1.2 |
| MnO | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| P2O5 | 0.4 | 0.4 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 |
| 烧失量 | 2.1 | 2.0 | 3.0 | 3.2 | 3.6 | 1.2 | 0.7 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 2.2 | 1.9 | 1.1 | 0.7 | 0.9 |
| 合计 | 99.3 | 99.9 | 99.6 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 |
| Mg# | 53 | 53 | 57 | 57 | 57 | 65 | 52 | 72 | 76 | 75 | 74 | 71 | 68 | 68 | 64 | 53 | 53 |
| V | 173 | 167 | 253 | 294 | 312 | 311 | 326 | 147 | 160 | 136 | 173 | 141 | 301 | 300 | 304 | 354 | 337 |
| Cr | 10 | 10 | 90 | 100 | 100 | 438 | 103 | 220 | 220 | 501 | 649 | 301 | 561 | 556 | 417 | 108 | 104 |
| Ga | 27.6 | 24.1 | 13.6 | 13.9 | 14.6 | 16.3 | 17.7 | 14.2 | 14.9 | 15.2 | 15.9 | 13.5 | 14.9 | 14.9 | 16.2 | 18.2 | 18.4 |
| Rb | 62.1 | 60.0 | 52.7 | 61.7 | 61.8 | 5.1 | 11.9 | 10.6 | 12.6 | 15.9 | 21.1 | 8.5 | 2.0 | 2.1 | 6.0 | 19.7 | 12.7 |
| Sr | 531 | 505 | 274 | 280 | 285 | 458 | 238 | 432 | 399 | 373 | 308 | 406 | 303 | 298 | 487 | 278 | 242 |
| Y | 18.6 | 21.4 | 14.2 | 16.8 | 17.0 | 21.6 | 23.0 | 19.2 | 19.7 | 19.8 | 19.9 | 19.0 | 20.3 | 19.4 | 22.5 | 24.8 | 23.6 |
| Zr | 128 | 126 | 131 | 139 | 136 | 142 | 141 | 48 | 49 | 53 | 58 | 45 | 131 | 130 | 148 | 146 | 141 |
| Nb | 15.1 | 14.6 | 5.5 | 5.6 | 5.8 | 16.2 | 16.6 | 4.1 | 3.3 | 4.3 | 5.2 | 3.2 | 14.4 | 14.3 | 16.0 | 17.6 | 18.4 |
| Cs | 1.6 | 1.6 | 4.7 | 5.2 | 5.2 | 0.3 | 1.2 | 0.7 | 0.7 | 0.7 | 0.8 | 0.6 | 0.1 | 0.1 | 0.3 | 1.6 | 1.0 |
| Ba | 311 | 337 | 325 | 343 | 346 | 77 | 139 | 139 | 142 | 159 | 194 | 111 | 31 | 31 | 137 | 217 | 130 |
| La | 20.0 | 19.1 | 26.0 | 28.5 | 28.6 | 20.2 | 21.0 | 12.7 | 14.4 | 14.1 | 14.8 | 12.0 | 18.2 | 18.6 | 21.0 | 22.6 | 21.9 |
| Ce | 51.1 | 48.5 | 47.3 | 49.0 | 49.7 | 46.3 | 49.3 | 28.2 | 28.3 | 28.9 | 28.5 | 25.2 | 41.4 | 41.8 | 47.0 | 50.8 | 48.8 |
| Pr | 7.0 | 7.0 | 5.2 | 5.3 | 5.2 | 6.3 | 7.0 | 3.9 | 4.0 | 4.2 | 4.2 | 3.5 | 5.6 | 5.7 | 6.2 | 6.9 | 6.6 |
| Nd | 32.2 | 30.6 | 18.3 | 18.7 | 19.2 | 27.2 | 26.9 | 16.8 | 18.5 | 1928 | 20.2 | 14.2 | 24.1 | 24.6 | 27.7 | 28.7 | 27.4 |
| Sm | 7.38 | 7.91 | 3.55 | 3.38 | 3.49 | 5.58 | 5.46 | 3.70 | 3.98 | 4.10 | 4.12 | 3.61 | 5.11 | 5.09 | 5.67 | 5.97 | 5.61 |
| Eu | 1.89 | 1.97 | 1.05 | 1.23 | 1.26 | 1.76 | 1.81 | 0.87 | 0.80 | 0.78 | 0.72 | 0.83 | 1.64 | 1.58 | 1.79 | 1.91 | 1.79 |
| Gd | 8.10 | 7.92 | 2.98 | 3.27 | 3.38 | 5.14 | 5.27 | 3.45 | 3.43 | 3.42 | 3.50 | 3.44 | 4.80 | 4.92 | 5.37 | 5.73 | 5.39 |
| Tb | 1.21 | 1.22 | 0.39 | 0.51 | 0.51 | 0.84 | 0.86 | 0.60 | 0.52 | 0.59 | 0.60 | 0.56 | 0.78 | 0.77 | 0.87 | 0.92 | 0.88 |
| Dy | 7.73 | 7.81 | 2.44 | 2.88 | 2.87 | 4.34 | 4.95 | 3.41 | 3.43 | 3.47 | 3.52 | 3.40 | 4.18 | 4.16 | 4.48 | 5.05 | 4.84 |
| Ho | 1.61 | 1.52 | 0.52 | 0.56 | 0.56 | 0.86 | 1.11 | 0.69 | 0.70 | 0.71 | 0.71 | 0.69 | 0.83 | 0.81 | 0.89 | 1.01 | 0.98 |
| Er | 4.84 | 4.32 | 1.42 | 1.55 | 1.55 | 2.15 | 2.57 | 1.80 | 1.79 | 1.80 | 1.82 | 1.78 | 2.06 | 2.04 | 2.18 | 2.55 | 2.48 |
| Tm | 0.72 | 0.66 | 0.21 | 0.24 | 0.24 | 0.30 | 0.38 | 0.26 | 0.26 | 0.27 | 0.28 | 0.23 | 0.30 | 0.28 | 0.31 | 0.37 | 0.37 |
| Yb | 4.73 | 4.34 | 1.30 | 1.46 | 1.45 | 1.94 | 2.30 | 1.76 | 1.76 | 1.77 | 1.80 | 1.73 | 1.81 | 1.82 | 2.00 | 2.32 | 2.29 |
| Lu | 0.72 | 0.68 | 0.20 | 0.24 | 0.23 | 0.29 | 0.33 | 0.28 | 0.28 | 0.26 | 0.28 | 0.27 | 0.27 | 0.27 | 0.30 | 0.36 | 0.34 |
| Hf | 8.90 | 8.10 | 3.20 | 3.50 | 3.50 | 3.88 | 3.87 | 1.27 | 1.51 | 1.70 | 1.80 | 1.39 | 3.57 | 3.50 | 3.95 | 3.91 | 3.65 |
| Ta | 0.80 | 0.90 | 0.40 | 0.40 | 0.40 | 1.11 | 1.20 | 0.31 | 0.32 | 0.34 | 0.39 | 0.29 | 1.01 | 1.00 | 1.16 | 1.27 | 1.21 |
| Th | 2.88 | 2.48 | 1.23 | 1.39 | 1.33 | 2.36 | 2.90 | 1.26 | 1.38 | 1.50 | 1.63 | 1.14 | 2.12 | 2.03 | 2.46 | 3.06 | 2.93 |
| U | 1.16 | 1.13 | 0.32 | 0.36 | 0.37 | 0.55 | 0.65 | 1.06 | 1.23 | 1.29 | 1.54 | 0.81 | 0.49 | 0.45 | 0.56 | 0.64 | 0.65 |
| ∑REE | 149 | 144 | 111 | 117 | 118 | 123 | 130 | 78 | 82 | 84 | 85 | 71 | 111 | 112 | 126 | 135 | 130 |
| 注：\*数据来自Cai *et al*.（2014）, 斜长角闪岩采样位置为哀牢山群阿龙组，经纬度为23°02′38.3″N、102°45′33.3″E.  附表2 点苍山地区斜长角闪岩锆石U-Pb同位素测试结果  Table 2 Zircon U-Pb dating results of the amphibolites in the Diancangshan area   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 点号 | 元素含量(10-6) | | Th/U | 同位素比值 | | | | | | 年龄(Ma) | | | | | | | Th | U | 207Pb/206Pb | ±1σ | 207Pb/235U | ±1σ | 206Pb/238U | ±1σ | 207Pb/206Pb | ±1σ | 207Pb/235U | ±1σ | 206Pb/238U | ±1σ | | 16MH33，斜长角闪岩 | | | | | | | | | | | | | | | | | 1 | 678 | 1518 | 0.45 | 0.0652 | 0.001 | 1.1918 | 0.03 | 0.1323 | 0.003 | 789 | 19 | 797 | 12 | 801 | 12 | | 2 | 462 | 669 | 0.69 | 0.0643 | 0.001 | 1.1425 | 0.02 | 0.1284 | 0.001 | 750 | 31 | 774 | 10 | 779 | 8 | | 3 | 258 | 345 | 0.75 | 0.065 | 0.001 | 1.1093 | 0.03 | 0.1242 | 0.001 | 776 | 46 | 758 | 12 | 755 | 9 | | 4 | 231 | 835 | 0.28 | 0.0639 | 0.001 | 1.1374 | 0.01 | 0.1286 | 0.001 | 739 | 21 | 771 | 7 | 780 | 5 | | 5 | 247 | 437 | 0.57 | 0.066 | 0.002 | 1.1496 | 0.04 | 0.1306 | 0.006 | 809 | 66 | 777 | 19 | 791 | 4 | | 6 | 1552 | 1630 | 0.95 | 0.0641 | 0.001 | 1.1071 | 0.02 | 0.1253 | 0.001 | 746 | 33 | 757 | 10 | 761 | 8 | | 7 | 63 | 302 | 0.21 | 0.0662 | 0.001 | 1.1206 | 0.02 | 0.1229 | 0.001 | 813 | 46 | 763 | 12 | 747 | 7 | | 8 | 3580 | 1617 | 2.21 | 0.0673 | 0.002 | 1.1196 | 0.03 | 0.1222 | 0.002 | 856 | 73 | 763 | 15 | 743 | 9 | | 9 | 701 | 543 | 1.29 | 0.0663 | 0.002 | 1.1412 | 0.03 | 0.1243 | 0.001 | 817 | 56 | 773 | 15 | 755 | 7 | | 10 | 104 | 229 | 0.45 | 0.0642 | 0.001 | 1.1295 | 0.02 | 0.1273 | 0.001 | 748 | 43 | 767 | 11 | 773 | 6 | | 11 | 375 | 483 | 0.78 | 0.0657 | 0.001 | 1.139 | 0.02 | 0.1252 | 0.002 | 796 | 36 | 772 | 11 | 760 | 9 | | 12 | 394 | 530 | 0.74 | 0.0639 | 0.001 | 1.1194 | 0.02 | 0.1274 | 0.002 | 739 | 34 | 763 | 10 | 773 | 10 | | 13 | 60 | 305 | 0.2 | 0.0654 | 0.002 | 1.1218 | 0.03 | 0.1237 | 0.001 | 787 | 64 | 764 | 16 | 752 | 8 | | 14 | 71 | 197 | 0.36 | 0.0644 | 0.001 | 1.1354 | 0.03 | 0.1283 | 0.002 | 755 | 49 | 770 | 13 | 778 | 21 | | 15 | 1169 | 1229 | 0.95 | 0.0663 | 0.001 | 1.1423 | 0.02 | 0.1251 | 0.001 | 815 | 36 | 774 | 10 | 760 | 8 | | 16 | 107 | 536 | 0.2 | 0.0654 | 0.001 | 1.0973 | 0.02 | 0.1212 | 0.001 | 787 | 34 | 752 | 9 | 738 | 4 | | 17 | 71 | 237 | 0.3 | 0.0669 | 0.001 | 1.1231 | 0.02 | 0.1215 | 0.001 | 835 | 41 | 764 | 11 | 739 | 5 | | 18 | 39 | 179 | 0.22 | 0.0686 | 0.002 | 1.1488 | 0.03 | 0.1223 | 0.002 | 887 | 81 | 777 | 13 | 744 | 10 | | 19 | 310 | 495 | 0.63 | 0.0674 | 0.002 | 1.1409 | 0.03 | 0.1229 | 0.002 | 850 | 51 | 773 | 15 | 747 | 4 | | 20 | 537 | 792 | 0.68 | 0.0651 | 0.001 | 1.1446 | 0.02 | 0.1274 | 0.001 | 776 | 28 | 775 | 7 | 773 | 5 | | 21 | 1321 | 1347 | 0.98 | 0.064 | 0.001 | 1.1262 | 0.02 | 0.1275 | 0.001 | 743 | 25 | 766 | 7 | 773 | 4 | | 22 | 246 | 507 | 0.49 | 0.0639 | 0.001 | 1.1247 | 0.02 | 0.1284 | 0.001 | 739 | 36 | 765 | 9 | 779 | 7 | | 23 | 352 | 465 | 0.76 | 0.0651 | 0.001 | 1.132 | 0.03 | 0.1268 | 0.002 | 776 | 36 | 769 | 13 | 769 | 13 | | 24 | 187 | 794 | 0.24 | 0.0657 | 0.001 | 1.1553 | 0.03 | 0.1279 | 0.002 | 798 | 33 | 780 | 12 | 776 | 5 | | 25 | 189 | 316 | 0.6 | 0.0643 | 0.002 | 1.1222 | 0.03 | 0.1262 | 0.001 | 750 | 56 | 764 | 16 | 766 | 9 | | 26 | 2415 | 1255 | 1.92 | 0.0648 | 0.001 | 1.1368 | 0.02 | 0.127 | 0.001 | 769 | 26 | 771 | 8 | 771 | 7 | | 27 | 61 | 267 | 0.23 | 0.0665 | 0.001 | 1.1509 | 0.03 | 0.1254 | 0.001 | 822 | 51 | 778 | 13 | 761 | 9 | | 28 | 133 | 436 | 0.31 | 0.0648 | 0.001 | 1.1290 | 0.02 | 0.1263 | 0.001 | 769 | 37 | 767 | 10 | 767 | 6 | | 29 | 633 | 604 | 1.05 | 0.064 | 0.001 | 1.1308 | 0.02 | 0.128 | 0.001 | 743 | 33 | 768 | 9 | 776 | 5 | | 30 | 88 | 197 | 0.45 | 0.0657 | 0.002 | 1.1466 | 0.03 | 0.1271 | 0.001 | 794 | 56 | 776 | 13 | 771 | 7 | | 16MH35，斜长角闪岩 | | | | | | | | | | | | | | | | | 1 | 214 | 1122 | 0.19 | 0.0638 | 0.002 | 1.1112 | 0.04 | 0.1262 | 0.004 | 744 | 70 | 759 | 17 | 766 | 21 | | 2 | 1052 | 3261 | 0.32 | 0.0667 | 0.002 | 0.7243 | 0.02 | 0.0786 | 0.002 | 831 | 65 | 553 | 14 | 488 | 14 | | 3 | 343 | 689 | 0.5 | 0.0656 | 0.002 | 1.1200 | 0.04 | 0.1232 | 0.0035 | 885 | -118 | 796 | 22 | 749 | 18 | | 4 | 399 | 754 | 0.53 | 0.0671 | 0.002 | 1.177 | 0.04 | 0.1271 | 0.004 | 839 | 70 | 790 | 19 | 771 | 21 | | 5 | 217 | 721 | 0.3 | 0.064 | 0.002 | 1.0785 | 0.04 | 0.126 | 0.005 | 743 | 70 | 743 | 18 | 765 | 8 | | 6 | 766 | 513 | 1.49 | 0.0725 | 0.004 | 1.1795 | 0.06 | 0.1361 | 0.009 | 998 | 115 | 791 | 28 | 823 | 16 | | 7 | 460 | 936 | 0.49 | 0.0736 | 0.007 | 1.1808 | 0.05 | 0.1252 | 0.004 | 1031 | 214 | 792 | 24 | 761 | 15 | | 8 | 413 | 560 | 0.74 | 0.0651 | 0.003 | 1.1284 | 0.05 | 0.1259 | 0.004 | 777 | 88 | 767 | 26 | 765 | 8 | | 9 | 520 | 563 | 0.92 | 0.0648 | 0.002 | 1.1561 | 0.04 | 0.1288 | 0.004 | 769 | 72 | 780 | 20 | 781 | 21 | | 10 | 255 | 713 | 0.36 | 0.0646 | 0.002 | 1.1414 | 0.04 | 0.1283 | 0.004 | 761 | 65 | 773 | 18 | 778 | 16 | | 11 | 381 | 554 | 0.69 | 0.0647 | 0.002 | 1.1585 | 0.04 | 0.1296 | 0.004 | 765 | 70 | 781 | 19 | 786 | 13 | | 12 | 239 | 613 | 0.39 | 0.0672 | 0.002 | 1.1853 | 0.04 | 0.1273 | 0.004 | 856 | 71 | 794 | 20 | 773 | 21 | | 13 | 198 | 967 | 0.20 | 0.0641 | 0.002 | 1.1462 | 0.04 | 0.1293 | 0.004 | 744 | 67 | 775 | 17 | 784 | 11 | | 14 | 238 | 529 | 0.45 | 0.0657 | 0.002 | 1.2517 | 0.04 | 0.138 | 0.004 | 798 | 69 | 824 | 19 | 833 | 15 | | 15 | 322 | 539 | 0.60 | 0.0633 | 0.002 | 1.1138 | 0.04 | 0.1273 | 0.004 | 717 | 66 | 760 | 18 | 772 | 8 | | 16 | 273 | 632 | 0.43 | 0.0649 | 0.003 | 1.1769 | 0.06 | 0.1345 | 0.004 | 772 | 106 | 790 | 28 | 814 | 14 | | 17 | 684 | 1017 | 0.67 | 0.0730 | 0.010 | 1.2621 | 0.09 | 0.1344 | 0.004 | 1013 | 289 | 829 | 42 | 813 | 10 | | 18 | 376 | 584 | 0.64 | 0.0637 | 0.002 | 1.1270 | 0.04 | 0.1278 | 0.004 | 731 | 69 | 766 | 18 | 775 | 8 | | 19 | 573 | 674 | 0.85 | 0.0624 | 0.002 | 1.1061 | 0.04 | 0.1285 | 0.004 | 687 | 69 | 756 | 17 | 779 | 21 | | 20 | 928 | 1129 | 0.82 | 0.0613 | 0.002 | 1.1020 | 0.04 | 0.1307 | 0.004 | 650 | 70 | 754 | 18 | 792 | 14 | | | | | | | | | | | | | | | | | | |