**Supplements**

Supplementary Table S1. Chemical composition of wodegongjieite in foil #5358

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Analysis number | 173 | 174 | 175 | 176 | 177 | 178 | 179 |  |  |  | |
| Net counts | | | | | | | | | | | | |
| C | 30 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  | |
| O | 1233 | 1170 | 1205 | 1169 | 1149 | 1218 | 1224 |  |  |  | |
| Al | 1404 | 1333 | 1204 | 1147 | 1219 | 1344 | 1189 |  |  |  | |
| Si | 1765 | 1633 | 1602 | 1513 | 1662 | 1711 | 1459 |  |  |  | |
| K | 195 | 143 | 119 | 153 | 140 | 138 | 145 |  |  |  | |
| Ca | 596 | 548 | 522 | 528 | 496 | 586 | 541 |  |  |  | |
| Cu | 1438 | 1491 | 1397 | 1363 | 1412 | 1455 | 1322 |  |  |  | |
| Sr | 42 | 34 | 45 | 34 | 34 | 28 | 23 |  |  |  | |
| weight % element Ave Stdev | | | | | | | | | | | wt%oxide | |
| Al | 33.67 | 34.77 | 32.83 | 32.65 | 33.07 | 34.22 | 34.33 | 33.65 | 0.82 | 34.09 | |
| Si | 41.92 | 42.23 | 43.29 | 42.66 | 44.65 | 43.13 | 41.76 | 42.81 | 1.00 | 49.11 | |
| K | 4.69 | 3.74 | 3.30 | 4.37 | 3.83 | 3.54 | 4.21 | 3.95 | 0.49 | 2.56 | |
| Ca | 15.30 | 15.38 | 15.28 | 16.09 | 14.43 | 16.00 | 16.75 | 15.60 | 0.75 | 11.71 | |
| Sr | 4.42 | 3.87 | 5.30 | 4.22 | 4.02 | 3.13 | 2.96 | 3.99 | 0.79 | 2.53 | |
| Total | 100 | 99.99 | 100 | 99.99 | 100 | 100.02 | 100.01 | 100.00 |  | 100.00 | |
|  |  |  |  |  |  |  |  |  |  |  | |
| atomic % Ave Stdev | | | | | | | | | | | Formula | |
| Al | 37.9 | 38.86 | 37.05 | 36.77 | 36.92 | 38.09 | 38.34 | 37.70 | 0.80 | 7.20 | |
| Si | 45.33 | 45.34 | 46.93 | 46.16 | 47.9 | 46.13 | 44.81 | 46.09 | 1.06 | 8.80 | |
| K | 3.64 | 2.89 | 2.57 | 3.4 | 2.95 | 2.72 | 3.24 | 3.06 | 0.38 | 0.58 | |
| Ca | 11.6 | 11.58 | 11.61 | 12.2 | 10.85 | 11.99 | 12.59 | 11.77 | 0.55 | 2.25 | |
| Sr | 1.53 | 1.33 | 1.84 | 1.47 | 1.38 | 1.07 | 1.02 | 1.38 | 0.28 | 0.26 | |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100.00 |  | 19.10 | |

Note: Cu counts come from the focused ion beam support grid, specifically, the prong to which the foil is attached. Because of the overlap between Si*Kα*and Sr*Lα* lines, the Sr*Kα* lines were used to establish the presence of Sr and to measure its content. There is no evidence that Na is present. The 7 spots are located within 1 µm of the spot where electron diffraction data were obtained in foil #5358 (Fig. 4). The formula was calculated for Al + Si = 16 per formula unit of 20 cations.

Supplementary Table S2. Chemical composition of minerals analysed for comparison with wodegongjieite

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | K-feldspar, KAlSi3O8 (15 analyses) | | | Cowlesite, Ca(Al2Si3)O10·5-6H2O (15 analyses) | | |
|  | Ave. At % | Stdev | formula units | Ave. At % | Stdev | formula units |
| Na | 0.00 | 0.00 | 0.00 | 0.90 | 0.54 | 0.05 |
| Al | 19.18 | 3.86 | 0.96 | 32.05 | 6.13 | 1.92 |
| Si | 60.59 | 10.20 | 3.03 | 51.60 | 7.16 | 3.10 |
| K | 20.24 | 3.87 | 1.01 | 0.00 | 0.00 | 0.00 |
| Ca | 0.00 | 0.00 | 0.00 | 15.45 | 3.66 | 0.93 |
| Fe | 0.00 | 0.00 | 0.00 |  |  |  |
| Sum | 100 |  | 5.00 | 100 |  | 6.00 |
| O calculated | 8.003 |  |  | 10.030 |  |  |

Supplementary Table S3. X-ray powder diffraction data (*d* in Å) obtained by simulation for wodegongjieite with Cu*Kα*1 radiation; Debye-Scherrer geometry.

*I*calc *d*calc *h k l* *I*calc *d*calc *h k l*

6.82 8.83 1 0 0 0.57 1.93 4 1 0

3.80 7.45 0 0 2 1.59 1.91 4 1 1

0.03 5.70 1 0 2 4.87 1.90 4 0 4

1.83 5.10 1 1 0 0.04 1.90 3 0 6

**72.77 4.42 2 0 0** 9.06 1.89 3 1 5

0.03 4.21 1 1 2 3.21 1.88 3 2 3

**90.82 3.80 2 0 2** 0.06 1.87 4 1 2

**67.75 3.73 0 0 4** 17.06 1.86 0 0 8

1.39 3.43 1 0 4 0.10 1.82 1 0 8

0.38 3.34 2 1 0 2.24 1.80 4 1 3

**48.51 3.26 2 1 1** 2.48 1.80 2 1 7

0.00 3.05 2 1 2 1.15 1.78 3 2 4

0.34 3.01 1 1 4 21.73 1.78 2 2 6

5.94 2.94 3 0 0 2.45 1.77 5 0 0

**100 2.85 2 0 4** 0.00 1.75 1 1 8

6.37 2.77 2 1 3 1.78 1.74 3 1 6

0.52 2.74 3 0 2 0.06 1.72 5 0 2

**71.17 2.55 2 2 0** 0.92 1.72 2 0 8

0.10 2.49 2 1 4 0.19 1.71 4 1 4

0.43 2.48 0 0 6 2.23 1.70 3 3 0

6.30 2.45 3 1 0 0.97 1.68 3 2 5

7.24 2.42 3 1 1 0.13 1.67 4 2 0

2.13 2.41 2 2 2 0.69 1.66 4 2 1

0.04 2.39 1 0 6 0.01 1.66 3 3 2

0.87 2.33 3 1 2 0.15 1.65 4 0 6

1.21 2.31 3 0 4 9.58 1.63 4 2 2

0.16 2.23 1 1 6 0.00 1.63 2 1 8

4.77 2.22 2 1 5 0.04 1.62 4 1 5

1.55 2.21 4 0 0 2.10 1.61 3 1 7

16.66 2.20 3 1 3 1.37 1.60 5 0 4

9.08 2.17 2 0 6 0.38 1.59 5 1 0

26.12 2.12 4 0 2 0.06 1.58 4 2 3

0.01 2.10 2 2 4 12.00 1.58 5 1 1

3.02 2.05 3 1 4 0.48 1.57 3 0 8

2.32 2.03 3 2 0 0.16 1.57 3 2 6

8.31 2.01 3 2 1 0.32 1.55 5 1 2

0.17 1.99 2 1 6 1.54 1.55 3 3 4

0.49 1.96 3 2 2

Note: **Bold** – most intense lines.