**Dataset S2.** Elemental composition of Si-rich rings surrounding ANME2-S-SRB aggregates.

**Spectrum 1.**

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Apparent Concentration | Wt% | Wt% Sigma |
| C | 30.26 | 54.92 | 0.46 |
| N | 1.54 | 1.80 | 0.73 |
| O | 21.57 | 24.70 | 0.28 |
| Mg | 0.25 | 0.17 | 0.02 |
| Al | 0.10 | 0.07 | 0.02 |
| Si | 17.16 | 11.18 | 0.11 |
| S | 0.44 | 0.31 | 0.03 |
| Ca | 9.76 | 6.84 | 0.09 |
| Fe | 0.00 | 0.00 | 0.00 |
| Sr | 0.00 | 0.00 | 0.00 |
| Ba | 0.00 | 0.00 | 0.00 |
| Total: |  | 100.00 |  |

**Spectrum 2.**

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Apparent Concentration | Wt% | Wt% Sigma |
| C | 42.61 | 61.48 | 0.19 |
| N | 0.00 | 0.00 | 0.00 |
| O | 12.42 | 13.94 | 0.18 |
| Mg | 0.32 | 0.17 | 0.02 |
| Al | 0.00 | 0.00 | 0.00 |
| Si | 22.33 | 11.79 | 0.07 |
| S | 0.09 | 0.05 | 0.02 |
| Ca | 21.88 | 12.56 | 0.09 |
| Fe | 0.00 | 0.00 | 0.00 |
| Sr | 0.00 | 0.00 | 0.00 |
| Ba | 0.00 | 0.00 | 0.00 |
| Total: |  | 100.00 |  |

**Spectrum 3.**

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Apparent Concentration | Wt% | Wt% Sigma |
| C | 35.06 | 44.08 | 0.35 |
| N | 3.78 | 3.44 | 0.65 |
| O | 29.55 | 28.33 | 0.27 |
| Mg | 0.58 | 0.32 | 0.02 |
| Al | 0.16 | 0.08 | 0.02 |
| Si | 14.71 | 7.65 | 0.08 |
| S | 0.36 | 0.20 | 0.02 |
| Ca | 29.34 | 15.91 | 0.14 |
| Fe | 0.00 | 0.00 | 0.00 |
| Sr | 0.00 | 0.00 | 0.00 |
| Ba | 0.00 | 0.00 | 0.00 |
| Total: |  | 100.00 |  |

**Spectrum 4.**

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Apparent Concentration | Wt% | Wt% Sigma |
| C | 8.95 | 51.05 | 0.21 |
| Mg | 0.73 | 0.80 | 0.03 |
| Al | 1.64 | 1.77 | 0.03 |
| Si | 24.09 | 26.60 | 0.13 |
| S | 0.20 | 0.26 | 0.03 |
| Ca | 15.18 | 18.55 | 0.11 |
| Fe | 0.63 | 0.96 | 0.07 |
| Total: |  | 100.00 |  |

**Spectrum 5.**

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Apparent Concentration | Wt% | Wt% Sigma |
| C | 7.15 | 51.75 | 0.23 |
| Mg | 0.52 | 0.58 | 0.02 |
| Al | 8.07 | 9.00 | 0.06 |
| Si | 22.39 | 27.76 | 0.14 |
| S | 0.05 | 0.07 | 0.03 |
| Ca | 8.10 | 10.75 | 0.08 |
| Fe | 0.06 | 0.10 | 0.06 |
| Total: |  | 100.00 |  |