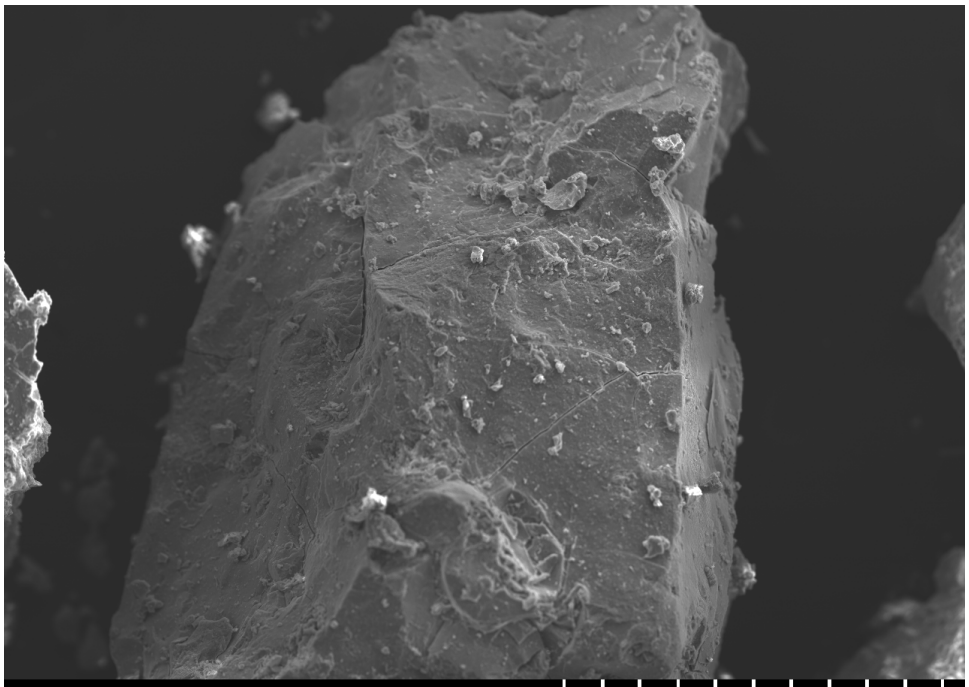
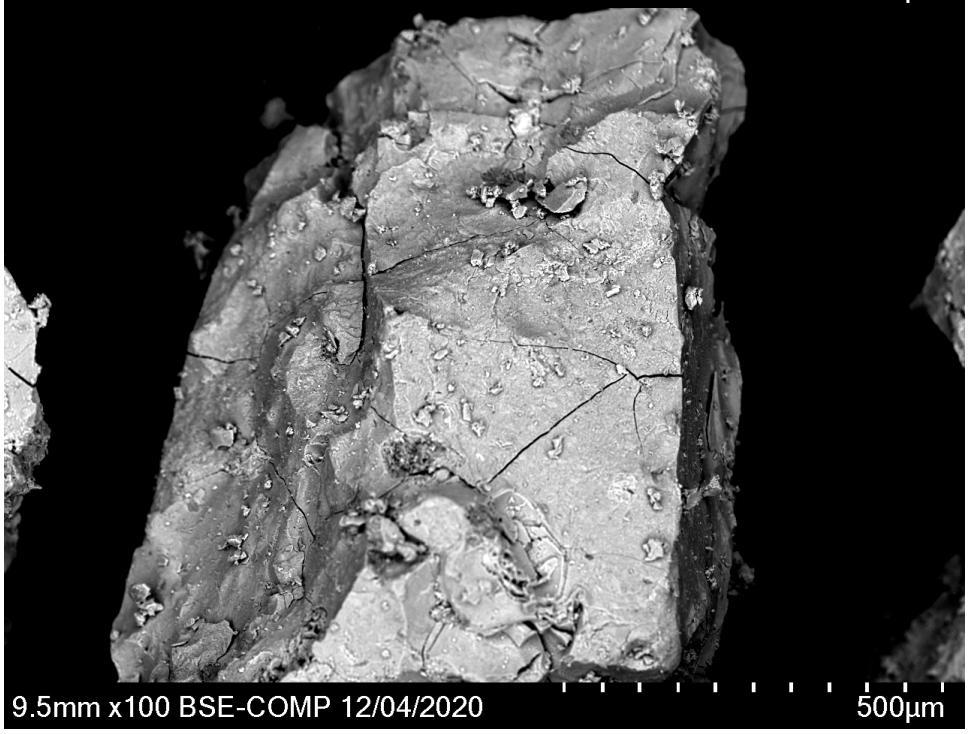
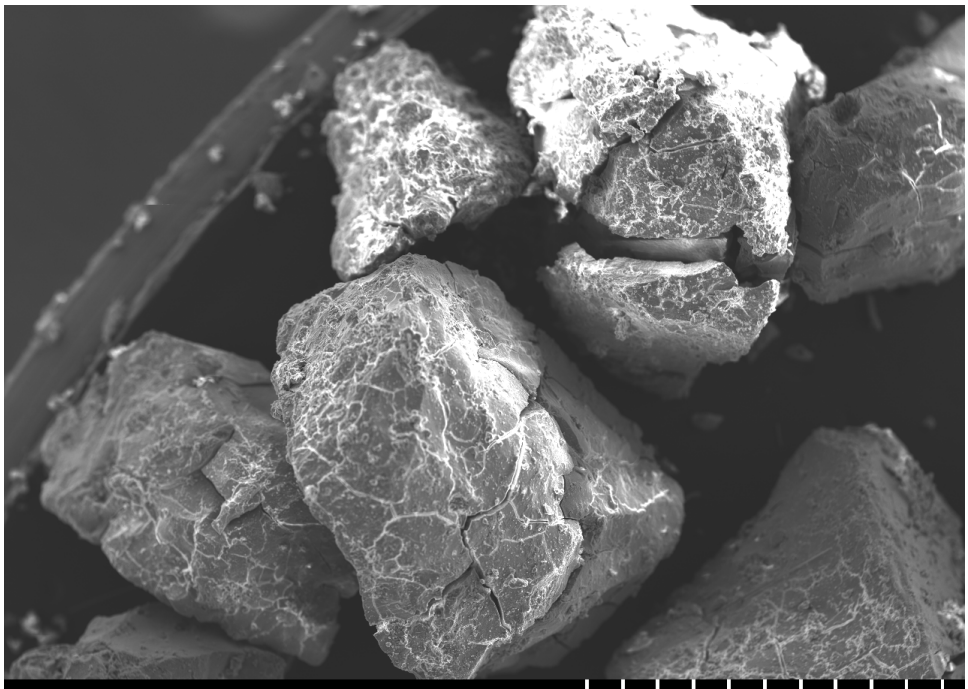
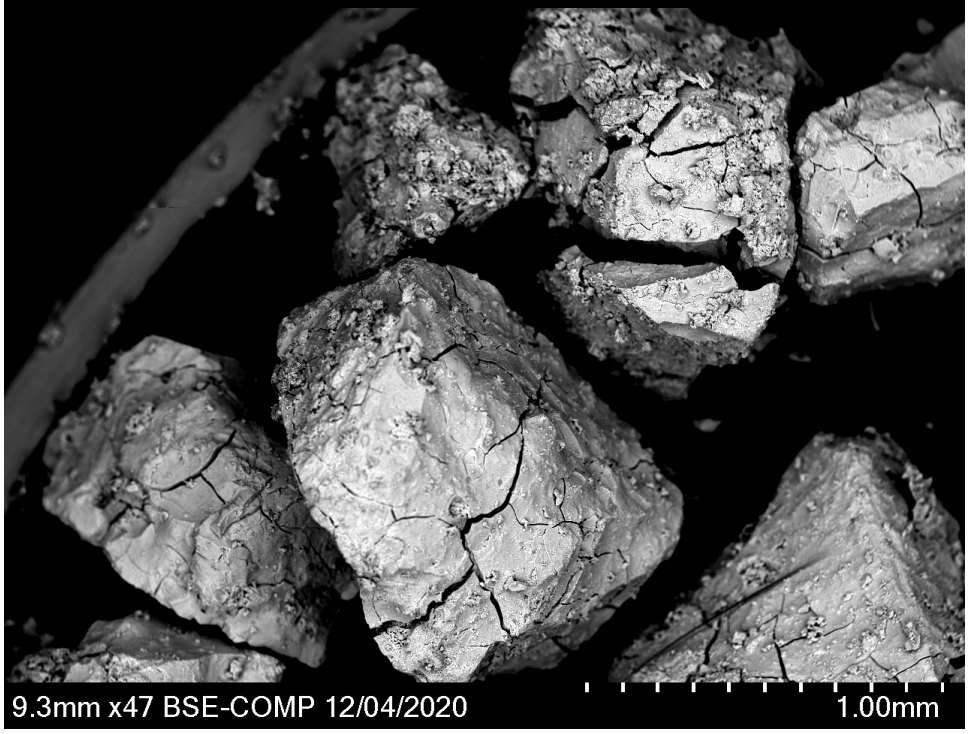
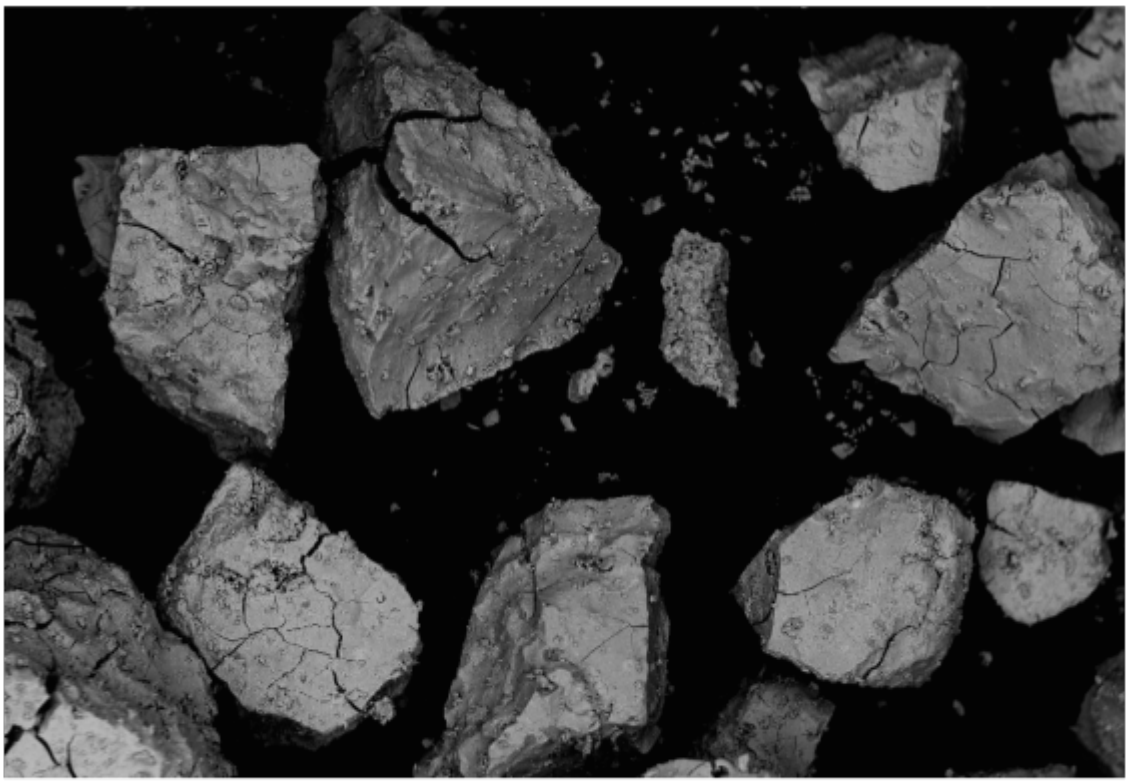

9.5mm x100 SE 12/04/2020
500µm


9.5mm x100 BSE-COMP 12/04/2020
500µm

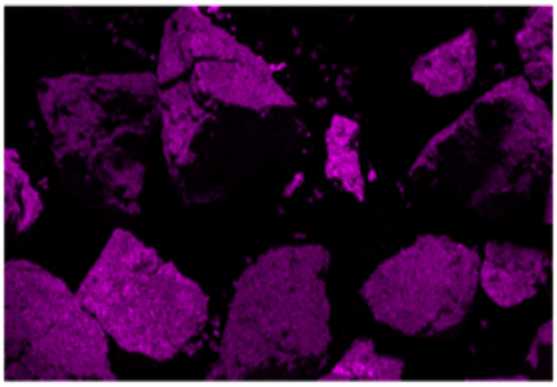

9.3mm x47 SE 12/04/2020
1.00mm


9.3mm x47 BSE-COMP 12/04/2020
1.00mm

*Appendix D: Elemental map - Artificial Solution #2 Neutralisation #1 Residue*

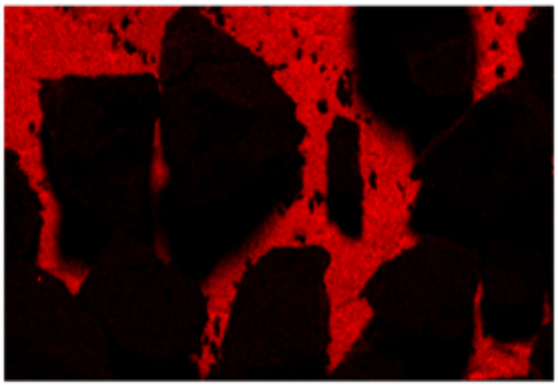


Cl Kα1



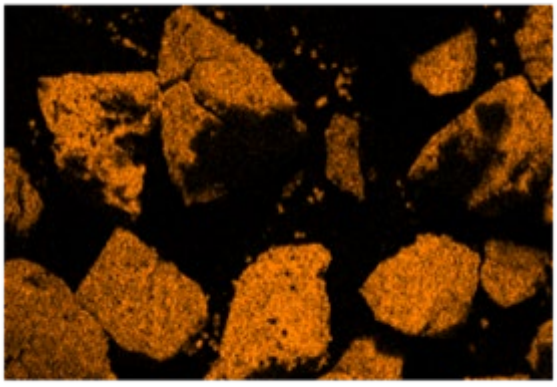
1mm

C Kα1_2



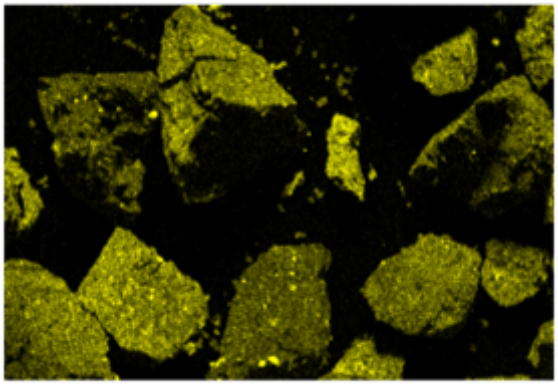
1mm

Fe Kα1



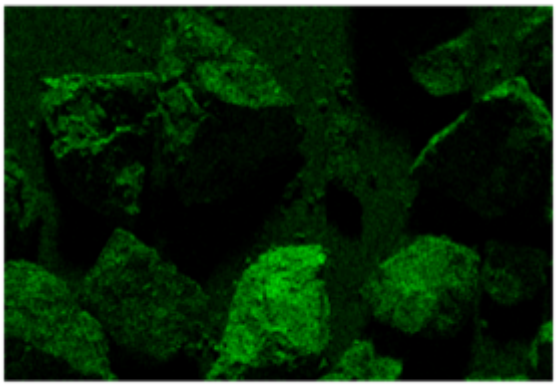
1mm

Ca Kα1



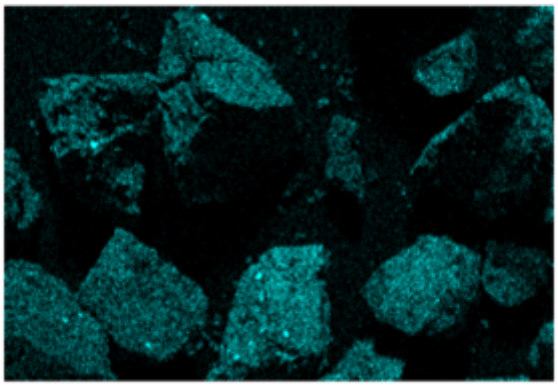
1mm

O Kα1

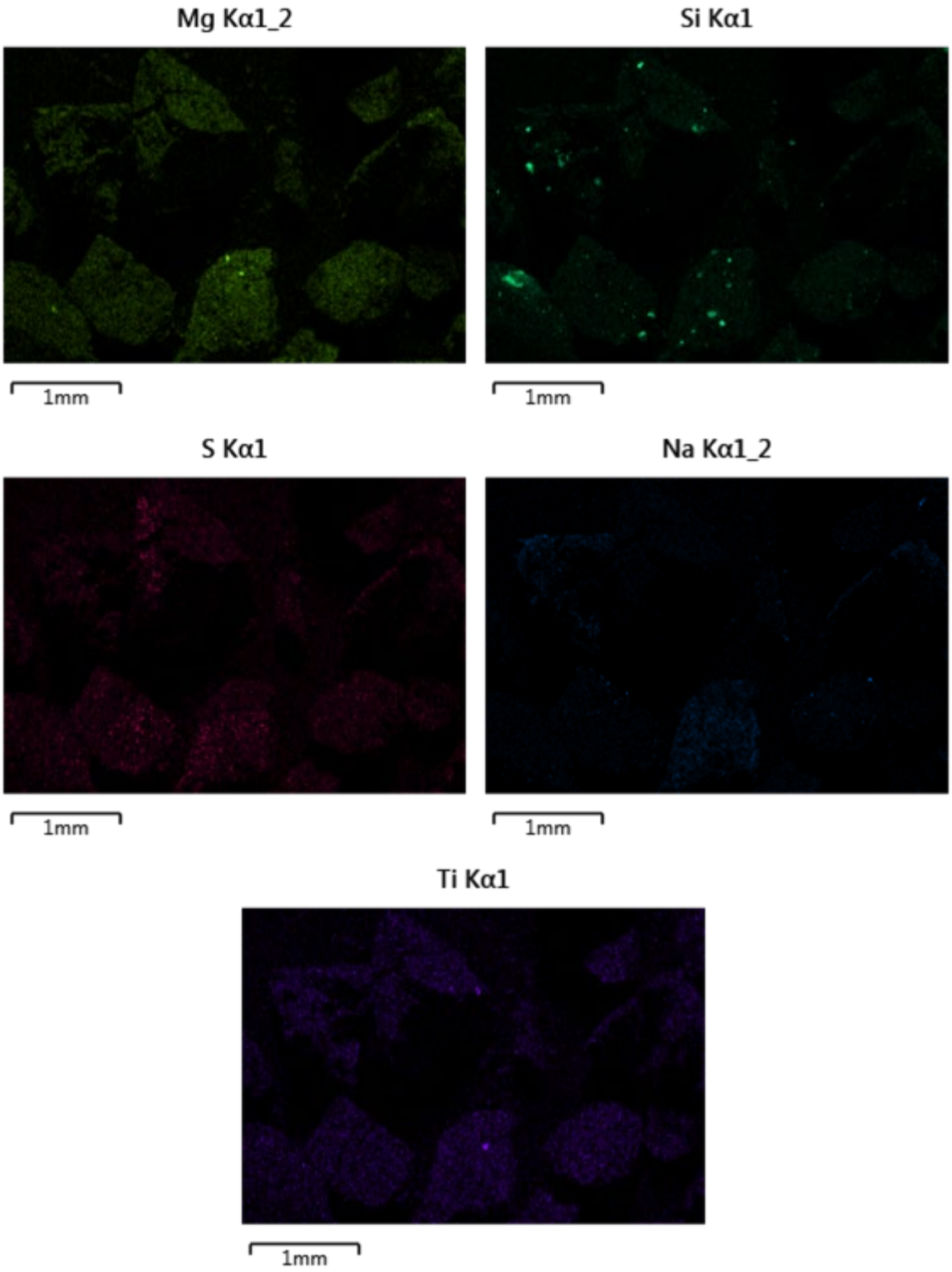


1mm

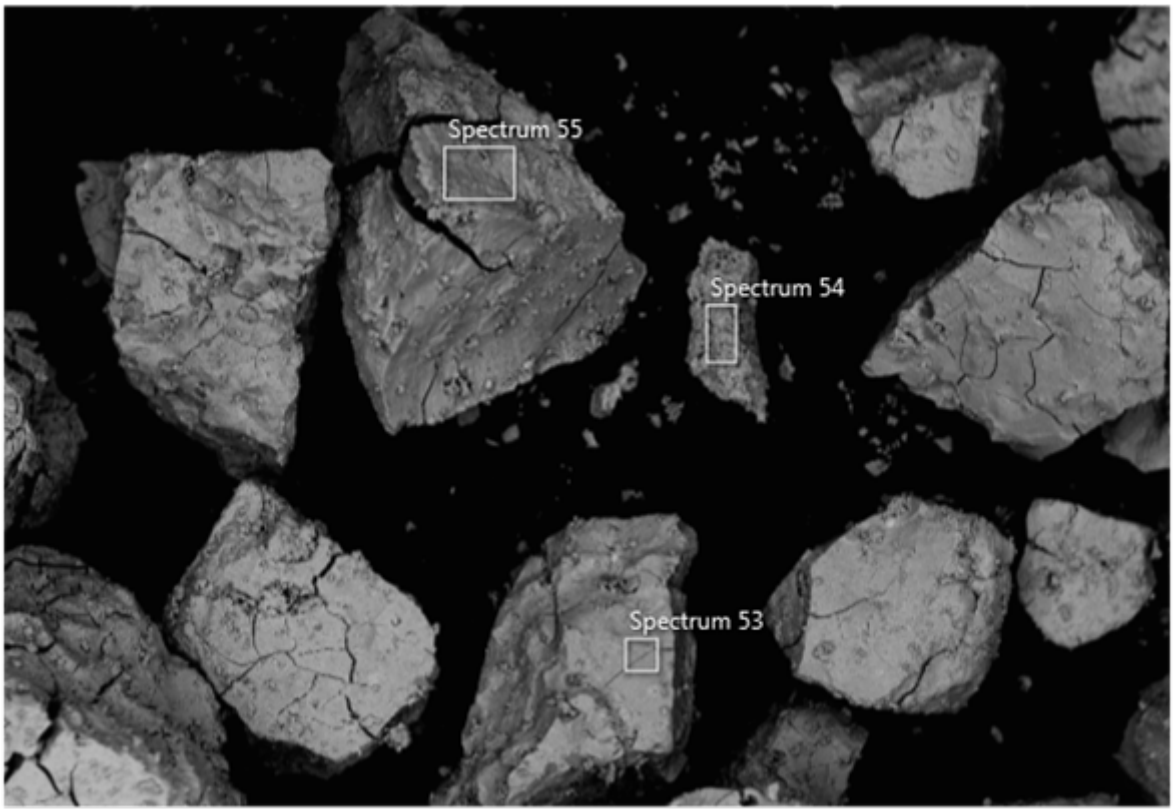
Al Kα1

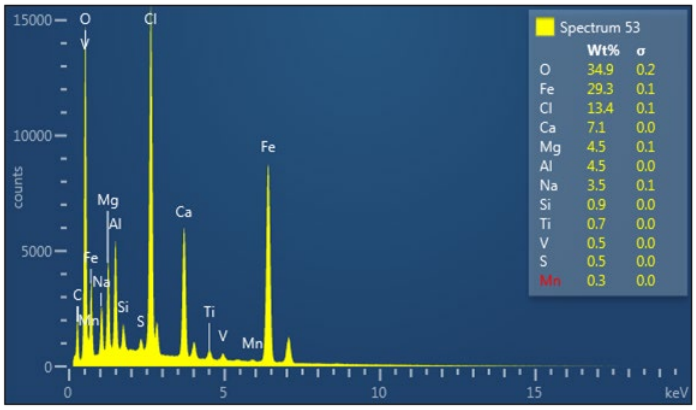


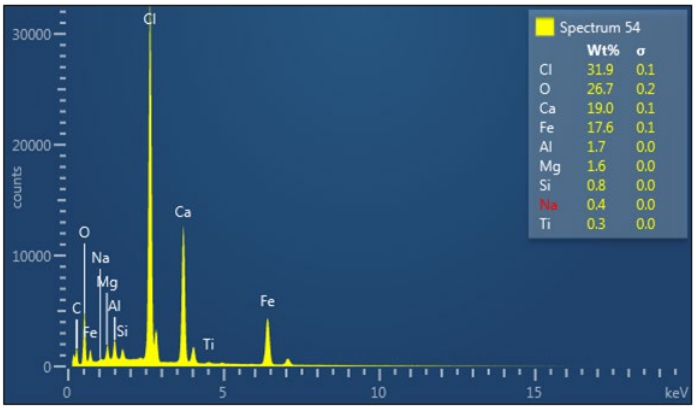
1mm

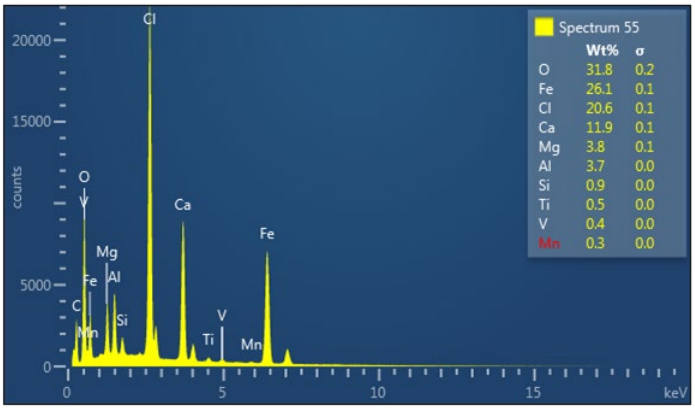

Mg Kα1_2
1mm
Si Kα1
1mm
S Kα1
1mm
Na Kα1_2
1mm
Ti Kα1
1mm

*Appendix D: EDS spectra – Artificial Solution #2 Neutralisation #1 Residue*

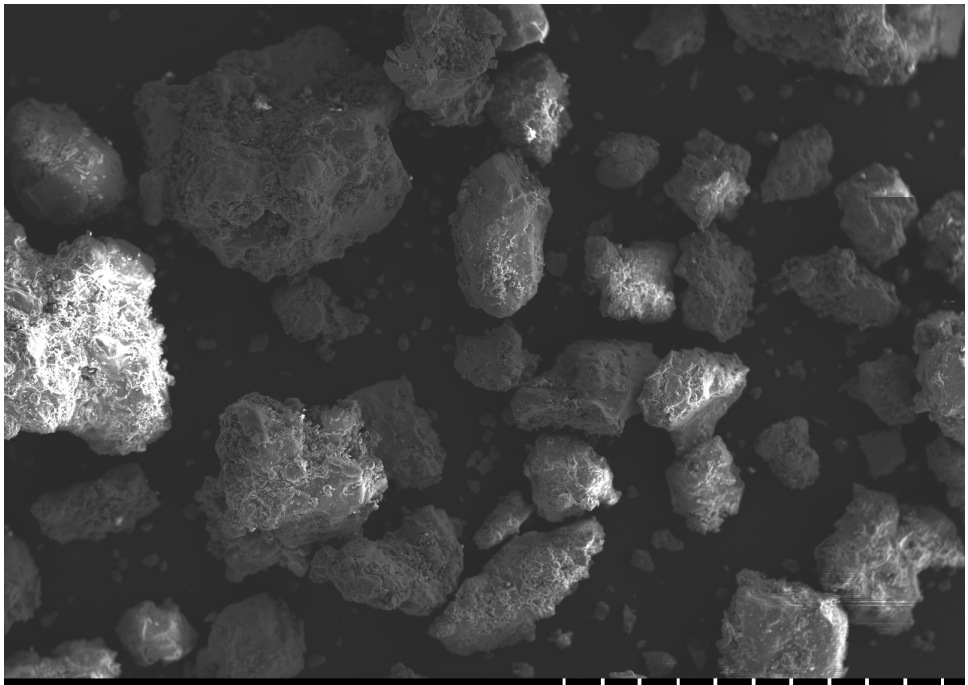


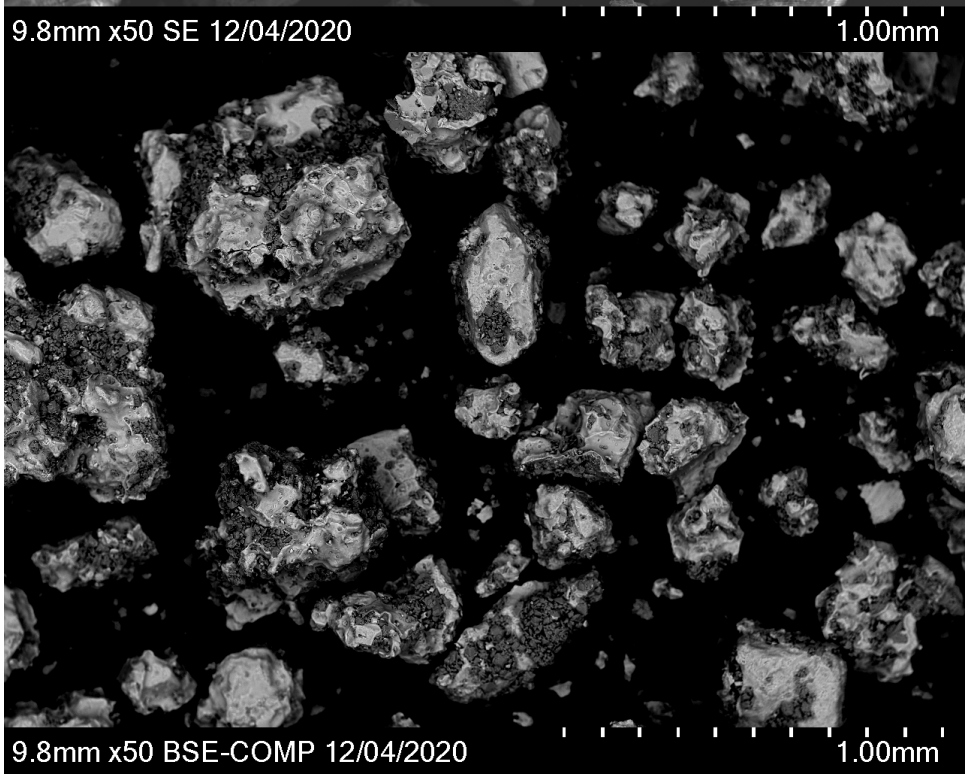



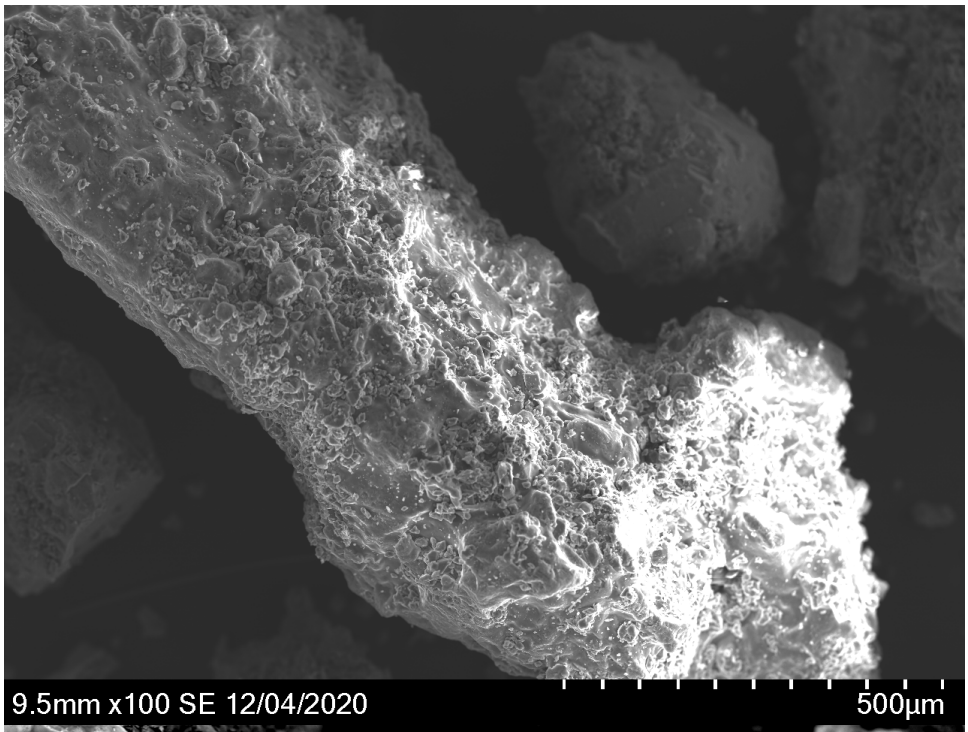



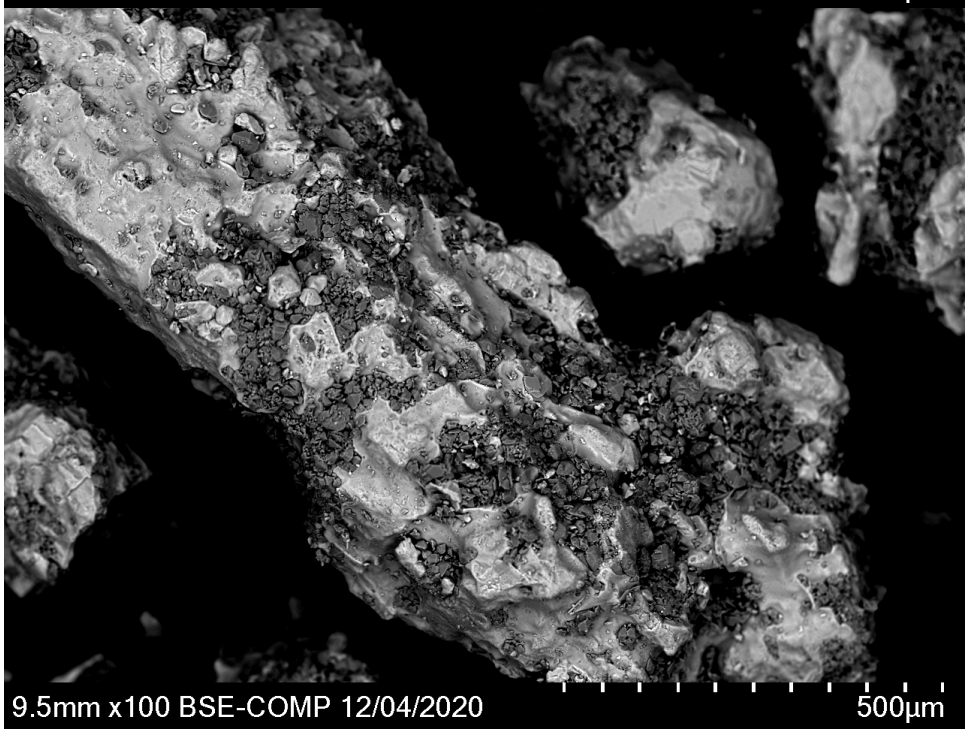



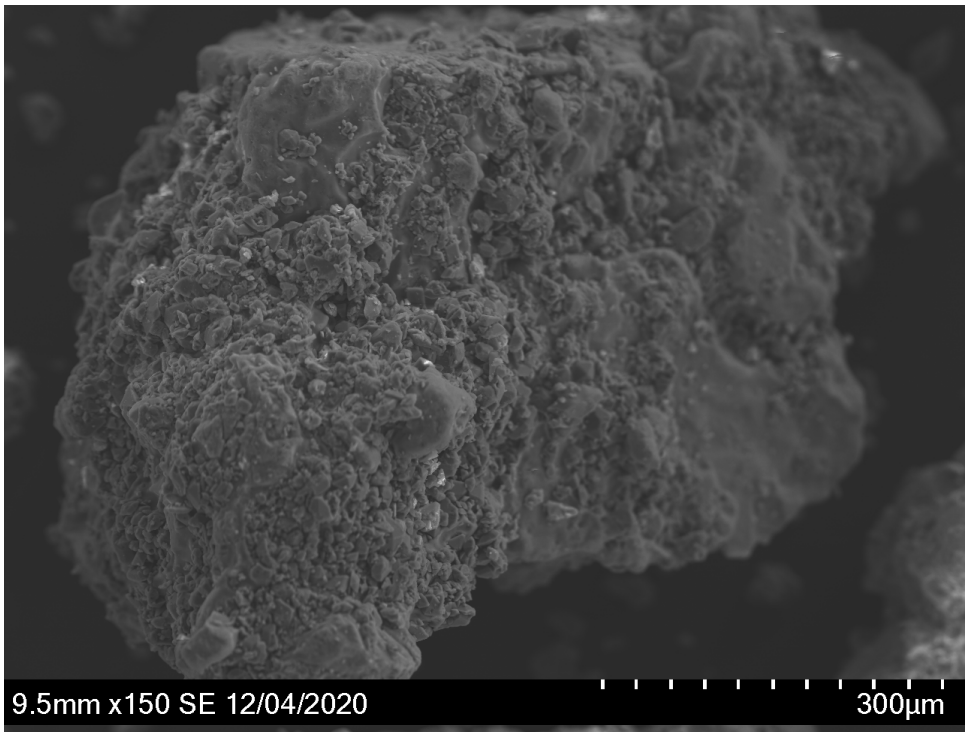
*Appendix D: SEM Images – Bulk Crystallisation Slurry*

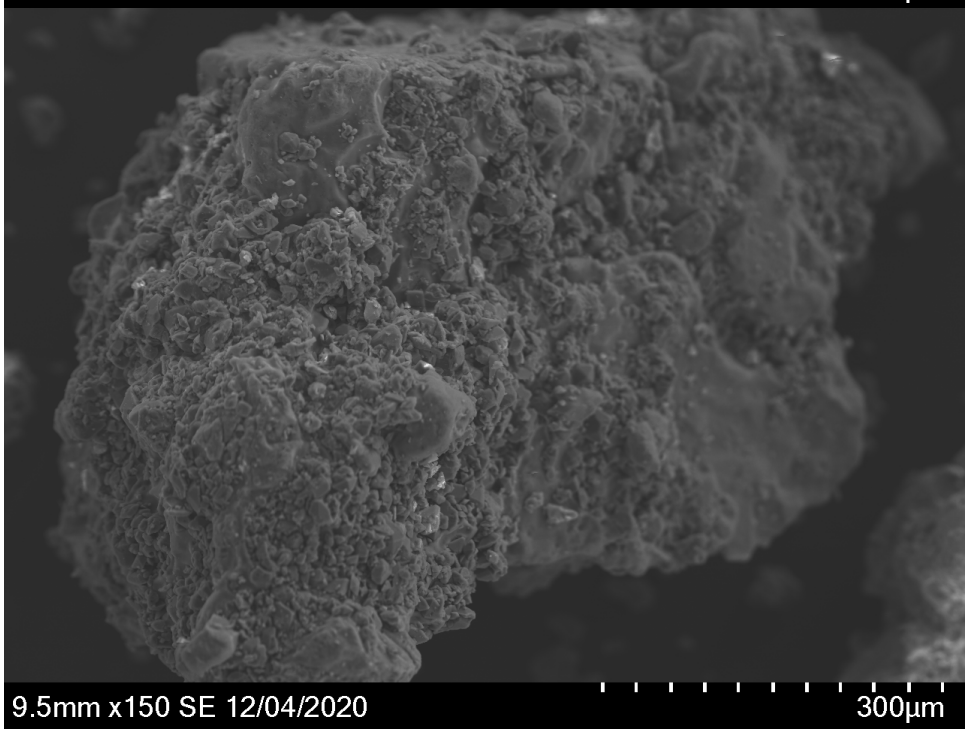


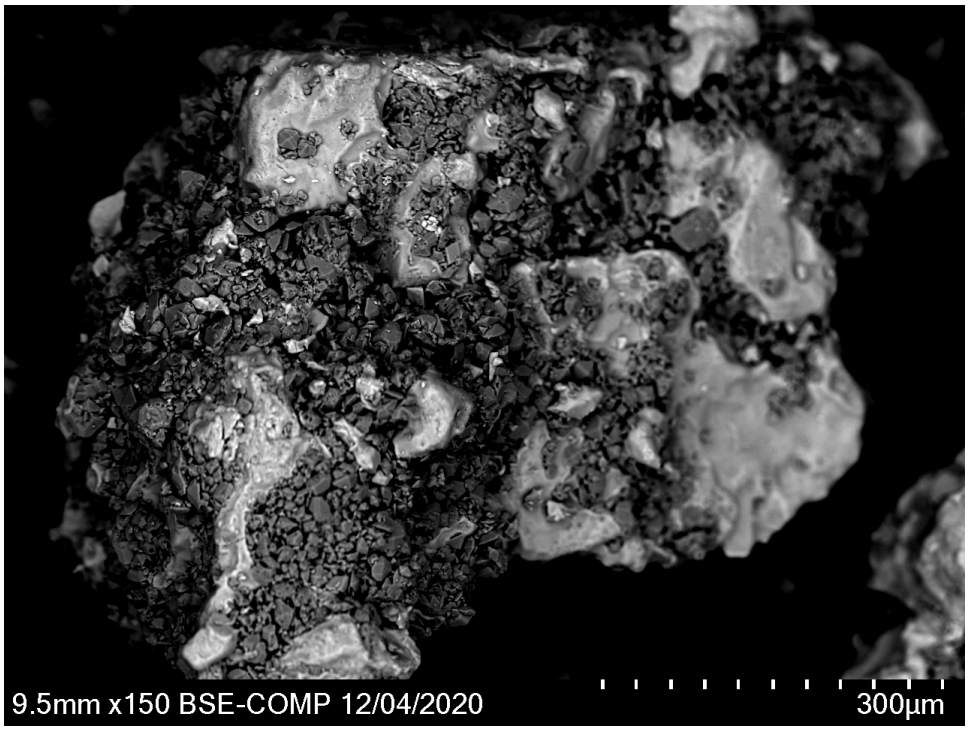




9.5mm x100 SE 12/04/2020
500µm

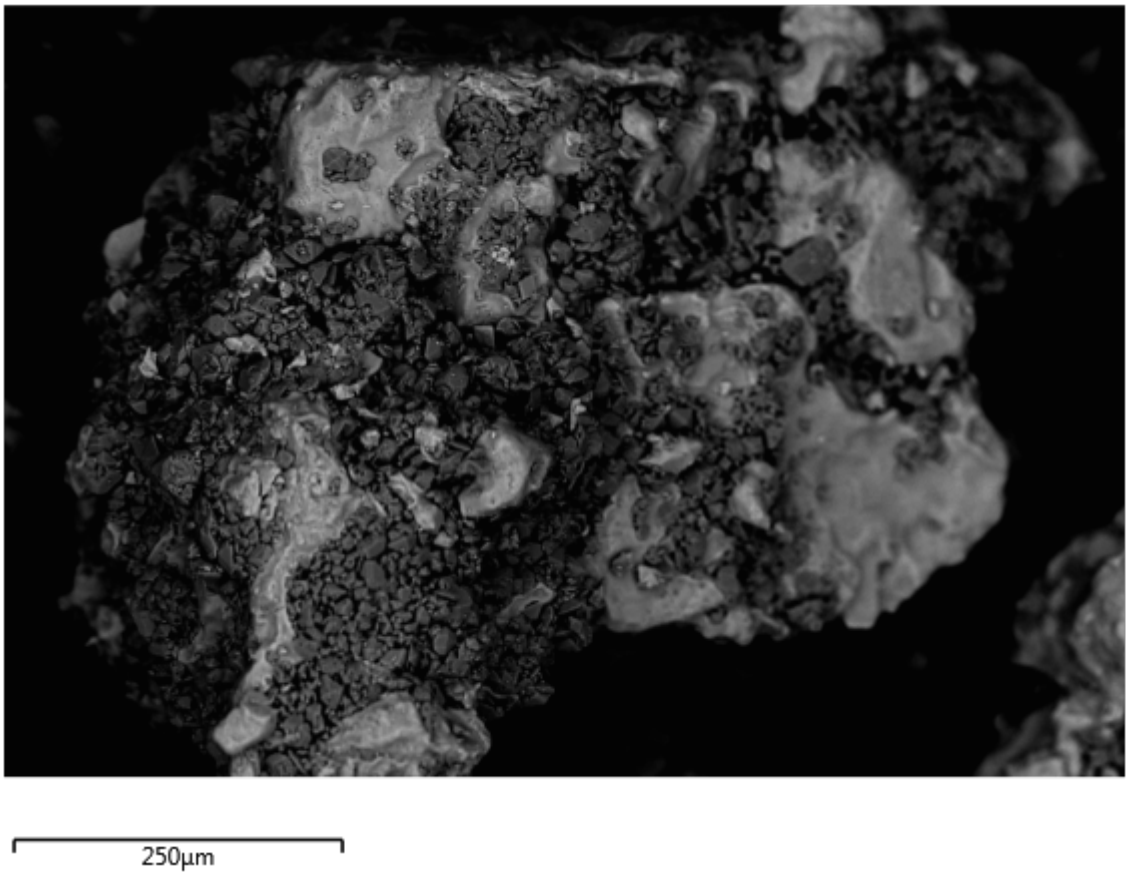

9.5mm x100 BSE-COMP 12/04/2020
500µm


9.5mm x150 SE 12/04/2020
300µm

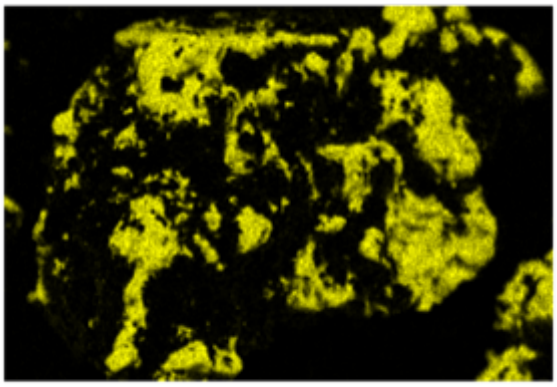

9.5mm x150 SE 12/04/2020
300µm


9.5mm x150 BSE-COMP 12/04/2020
300µm

*Appendix D: Elemental map - Bulk Crystallisation Slurry*

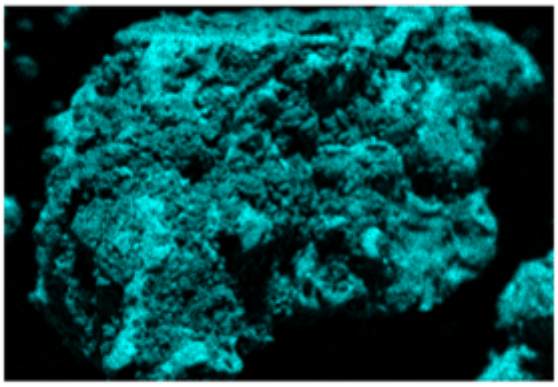


Cl K series



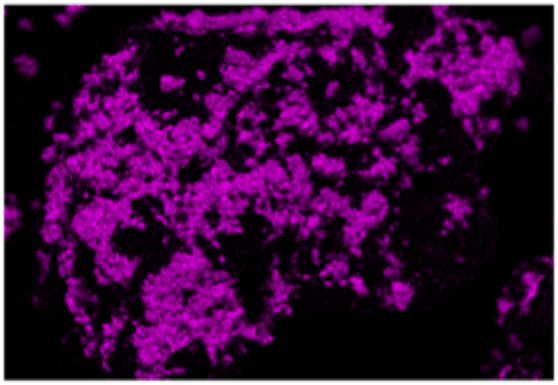
250µm

Na K series



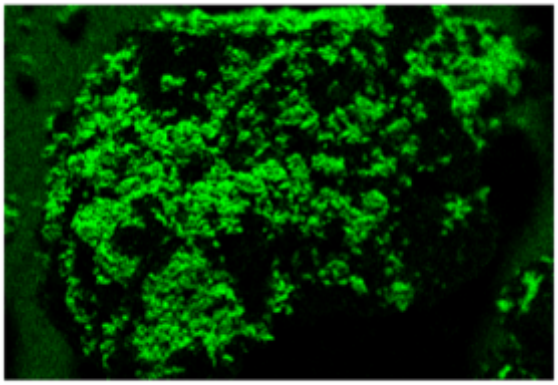
250µm

S K series



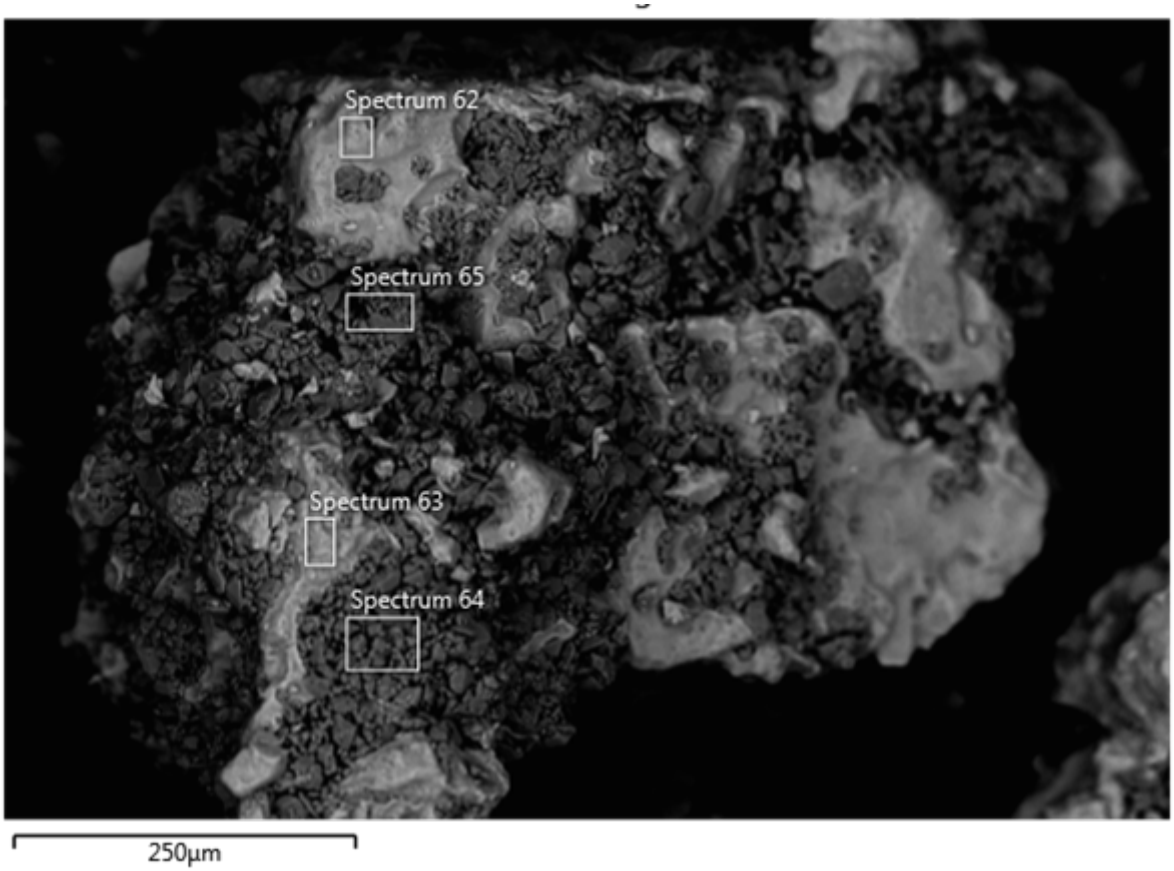
250µm

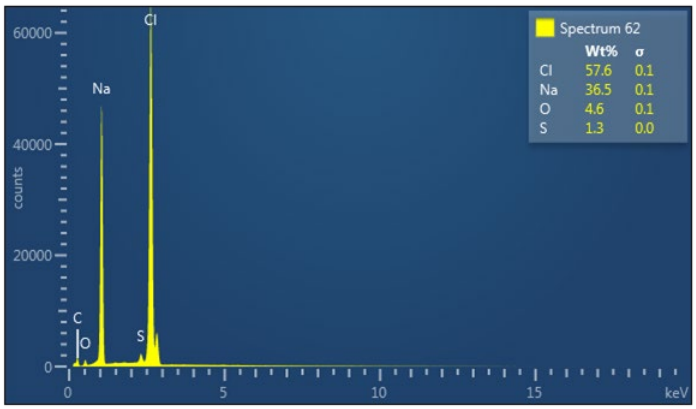
O K series

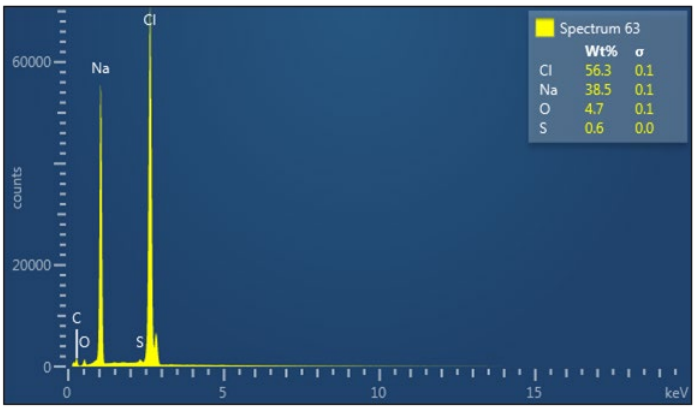


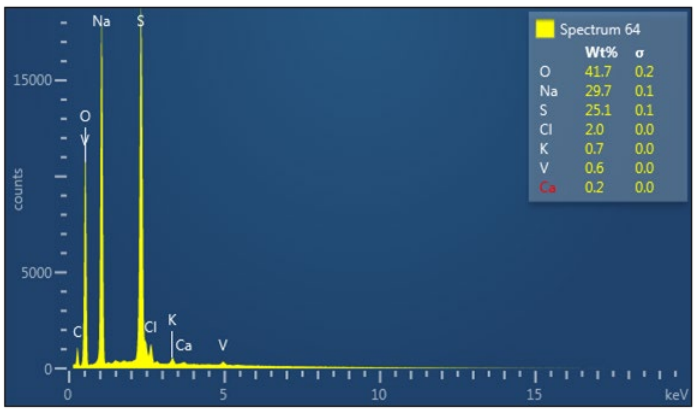
250µm

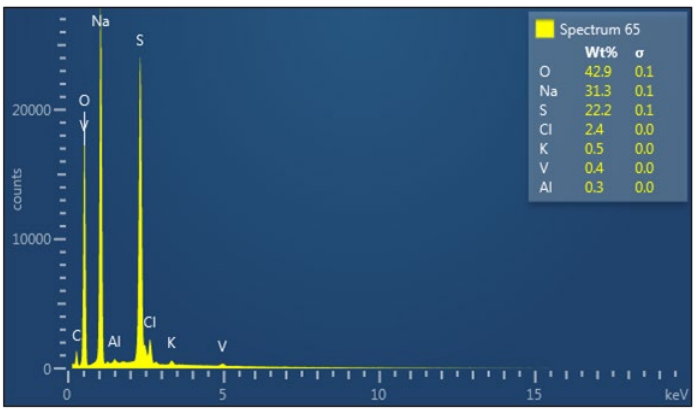
*Appendix D: EDS spectra – - Bulk Crystallisation Slurry*



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# APPENDIX E
# PSD Results

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20276 [Water]

**SOP Name:**

**Measured:**
Friday, 6 November 2020 11:28:56 AM

**Sample Source & type:**
Supplier

**Measured by:**
Andrew Robinson

**Analysed:**
Friday, 6 November 2020 11:28:58 AM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 2000.000 um

**Obscuration:**
3.75 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
1.107 %

**Result Emulation:**
Off

---

**Concentration:**
0.0143 %Vol

**Span :**
1.561

**Uniformity:**
0.495

**Result units:**
Volume

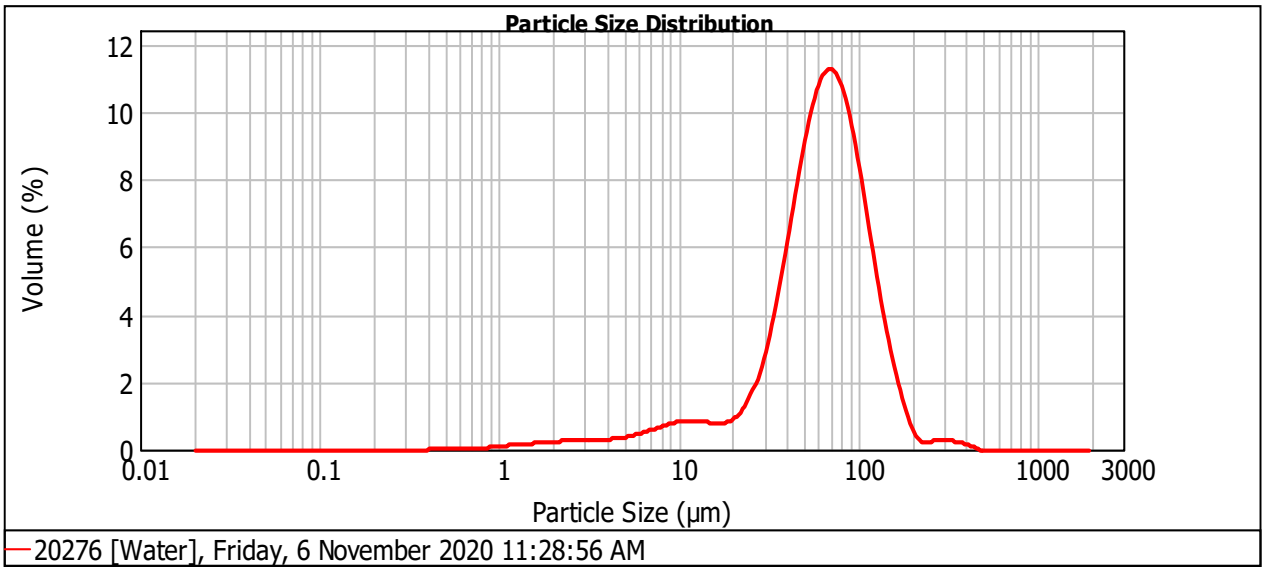
**Specific Surface Area:**
0.216 m²/g

**Surface Weighted Mean D[3,2]:**
27.806 um

**Vol. Weighted Mean D[4,3]:**
71.475 um

---

**d(0.1):** 22.861 um **d(0.5):** 64.644 um **d(0.9):** 123.759 um




| Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.020 | 0.00 | 0.142 | 0.00 | 1.002 | 0.08 | 7.096 | 0.48 | 50.238 | 7.38 | 355.656 | 0.14 |
| 0.022 | 0.00 | 0.159 | 0.00 | 1.125 | 0.10 | 7.962 | 0.54 | 56.368 | 8.12 | 399.052 | 0.09 |
| 0.025 | 0.00 | 0.178 | 0.00 | 1.262 | 0.12 | 8.934 | 0.60 | 63.246 | 8.49 | 447.744 | 0.00 |
| 0.028 | 0.00 | 0.200 | 0.00 | 1.416 | 0.14 | 10.024 | 0.63 | 70.963 | 8.41 | 502.377 | 0.00 |
| 0.032 | 0.00 | 0.224 | 0.00 | 1.589 | 0.15 | 11.247 | 0.65 | 79.621 | 7.90 | 563.677 | 0.00 |
| 0.036 | 0.00 | 0.252 | 0.00 | 1.783 | 0.17 | 12.619 | 0.63 | 89.337 | 7.01 | 632.456 | 0.00 |
| 0.040 | 0.00 | 0.283 | 0.00 | 2.000 | 0.18 | 14.159 | 0.61 | 100.237 | 5.87 | 709.627 | 0.00 |
| 0.045 | 0.00 | 0.317 | 0.00 | 2.244 | 0.19 | 15.887 | 0.59 | 112.468 | 4.61 | 796.214 | 0.00 |
| 0.050 | 0.00 | 0.356 | 0.00 | 2.518 | 0.20 | 17.825 | 0.61 | 126.191 | 3.41 | 893.367 | 0.00 |
| 0.056 | 0.00 | 0.399 | 0.01 | 2.825 | 0.21 | 20.000 | 0.73 | 141.589 | 2.36 | 1002.374 | 0.00 |
| 0.063 | 0.00 | 0.448 | 0.03 | 3.170 | 0.21 | 22.440 | 0.99 | 158.866 | 1.51 | 1124.683 | 0.00 |
| 0.071 | 0.00 | 0.502 | 0.03 | 3.557 | 0.22 | 25.179 | 1.43 | 178.250 | 0.77 | 1261.915 | 0.00 |
| 0.080 | 0.00 | 0.564 | 0.03 | 3.991 | 0.24 | 28.251 | 2.09 | 200.000 | 0.29 | 1415.892 | 0.00 |
| 0.089 | 0.00 | 0.632 | 0.04 | 4.477 | 0.26 | 31.698 | 2.97 | 224.404 | 0.15 | 1588.656 | 0.00 |
| 0.100 | 0.00 | 0.710 | 0.04 | 5.024 | 0.30 | 35.566 | 4.02 | 251.785 | 0.19 | 1782.502 | 0.00 |
| 0.112 | 0.00 | 0.796 | 0.05 | 5.637 | 0.35 | 39.905 | 5.20 | 282.508 | 0.19 | 2000.000 | |
| 0.126 | 0.00 | 0.893 | 0.05 | 6.325 | 0.41 | 44.774 | 6.35 | 316.979 | 0.19 | | |
| 0.142 | | 1.002 | | 7.096 | | 50.238 | | 355.656 | | | |

**Operator notes:** *Average of 2 measurements from EGI 2020-068.mea*

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20277 [Water]

**SOP Name:**

**Measured:**
Friday, 6 November 2020 11:50:04 AM

**Sample Source & type:**
Supplier

**Measured by:**
Andrew Robinson

**Analysed:**
Friday, 6 November 2020 11:50:05 AM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 2000.000 um

**Obscuration:**
24.34 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
0.629 %

**Result Emulation:**
Off

---

**Concentration:**
0.0202 %Vol

**Span :**
2.775

**Uniformity:**
0.85

**Result units:**
Volume

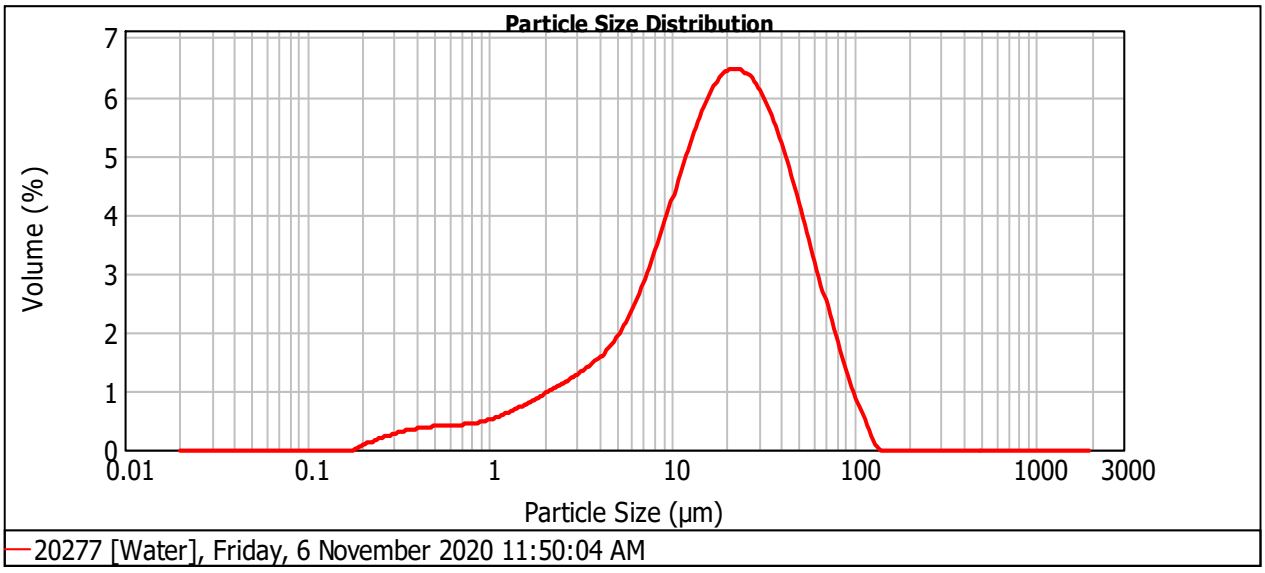
**Specific Surface Area:**
1.04 m²/g

**Surface Weighted Mean D[3,2]:**
5.762 um

**Vol. Weighted Mean D[4,3]:**
24.625 um

---

**d(0.1):** 3.106 um **d(0.5):** 18.548 um **d(0.9):** 54.583 um




| Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.020 | 0.00 | 0.142 | 0.00 | 1.002 | 0.40 | 7.096 | 2.30 | 50.238 | 2.94 | 355.656 | 0.00 |
| 0.022 | 0.00 | 0.159 | 0.00 | 1.125 | 0.44 | 7.962 | 2.64 | 56.368 | 2.51 | 399.052 | 0.00 |
| 0.025 | 0.00 | 0.178 | 0.01 | 1.262 | 0.50 | 8.934 | 3.00 | 63.246 | 2.07 | 447.744 | 0.00 |
| 0.028 | 0.00 | 0.200 | 0.08 | 1.416 | 0.55 | 10.024 | 3.38 | 70.963 | 1.64 | 502.377 | 0.00 |
| 0.032 | 0.00 | 0.224 | 0.12 | 1.589 | 0.62 | 11.247 | 3.74 | 79.621 | 1.24 | 563.677 | 0.00 |
| 0.036 | 0.00 | 0.252 | 0.17 | 1.783 | 0.68 | 12.619 | 4.09 | 89.337 | 0.87 | 632.456 | 0.00 |
| 0.040 | 0.00 | 0.283 | 0.20 | 2.000 | 0.75 | 14.159 | 4.38 | 100.237 | 0.56 | 709.627 | 0.00 |
| 0.045 | 0.00 | 0.317 | 0.23 | 2.244 | 0.81 | 15.887 | 4.62 | 112.468 | 0.31 | 796.214 | 0.00 |
| 0.050 | 0.00 | 0.356 | 0.26 | 2.518 | 0.88 | 17.825 | 4.78 | 126.191 | 0.03 | 893.367 | 0.00 |
| 0.056 | 0.00 | 0.399 | 0.28 | 2.825 | 0.95 | 20.000 | 4.86 | 141.589 | 0.00 | 1002.374 | 0.00 |
| 0.063 | 0.00 | 0.448 | 0.29 | 3.170 | 1.02 | 22.440 | 4.86 | 158.866 | 0.00 | 1124.683 | 0.00 |
| 0.071 | 0.00 | 0.502 | 0.30 | 3.557 | 1.12 | 25.179 | 4.78 | 178.250 | 0.00 | 1261.915 | 0.00 |
| 0.080 | 0.00 | 0.564 | 0.31 | 3.991 | 1.23 | 28.251 | 4.61 | 200.000 | 0.00 | 1415.892 | 0.00 |
| 0.089 | 0.00 | 0.632 | 0.32 | 4.477 | 1.37 | 31.698 | 4.38 | 224.404 | 0.00 | 1588.656 | 0.00 |
| 0.100 | 0.00 | 0.710 | 0.33 | 5.024 | 1.54 | 35.566 | 4.09 | 251.785 | 0.00 | 1782.502 | 0.00 |
| 0.112 | 0.00 | 0.796 | 0.34 | 5.637 | 1.75 | 39.905 | 3.75 | 282.508 | 0.00 | 2000.000 | |
| 0.126 | 0.00 | 0.893 | 0.37 | 6.325 | 2.01 | 44.774 | 3.36 | 316.979 | 0.00 | | |
| 0.142 | | 1.002 | | 7.096 | | 50.238 | | 355.656 | | | |

**Operator notes:**

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20278 [Water]

**SOP Name:**

**Measured:**
Friday, 6 November 2020 12:07:29 PM

**Sample Source & type:**
Supplier

**Measured by:**
Andrew Robinson

**Analysed:**
Friday, 6 November 2020 12:07:30 PM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 2000.000 um

**Obscuration:**
45.86 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
0.469 %

**Result Emulation:**
Off

---

**Concentration:**
0.0205 %Vol

**Span :**
8.043

**Uniformity:**
2.48

**Result units:**
Volume

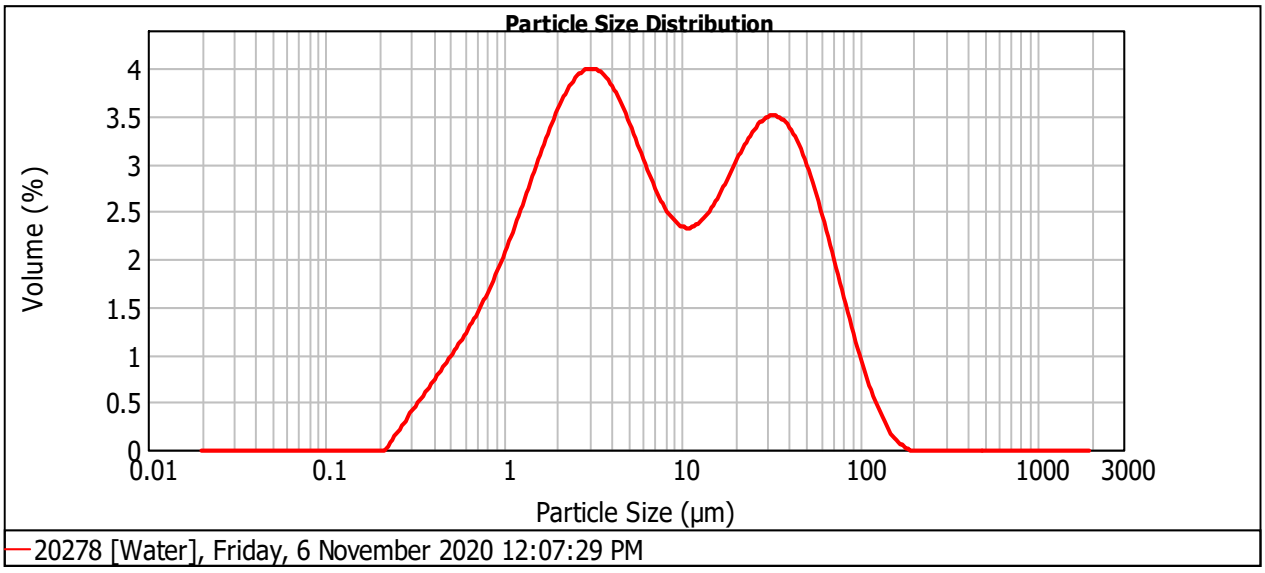
**Specific Surface Area:**
2.2 m²/g

**Surface Weighted Mean D[3,2]:**
2.728 um

**Vol. Weighted Mean D[4,3]:**
18.132 um

---

**d(0.1):** 1.044 um **d(0.5):** 6.293 um **d(0.9):** 51.659 um




| Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.020 | 0.00 | 0.142 | 0.00 | 1.002 | 1.64 | 7.096 | 1.98 | 50.238 | 2.15 | 355.656 | 0.00 |
| 0.022 | 0.00 | 0.159 | 0.00 | 1.125 | 1.83 | 7.962 | 1.86 | 56.368 | 1.91 | 399.052 | 0.00 |
| 0.025 | 0.00 | 0.178 | 0.00 | 1.262 | 2.04 | 8.934 | 1.78 | 63.246 | 1.65 | 447.744 | 0.00 |
| 0.028 | 0.00 | 0.200 | 0.00 | 1.416 | 2.24 | 10.024 | 1.75 | 70.963 | 1.38 | 502.377 | 0.00 |
| 0.032 | 0.00 | 0.224 | 0.11 | 1.589 | 2.43 | 11.247 | 1.77 | 79.621 | 1.11 | 563.677 | 0.00 |
| 0.036 | 0.00 | 0.252 | 0.19 | 1.783 | 2.61 | 12.619 | 1.83 | 89.337 | 0.86 | 632.456 | 0.00 |
| 0.040 | 0.00 | 0.283 | 0.30 | 2.000 | 2.77 | 14.159 | 1.93 | 100.237 | 0.62 | 709.627 | 0.00 |
| 0.045 | 0.00 | 0.317 | 0.39 | 2.244 | 2.89 | 15.887 | 2.06 | 112.468 | 0.42 | 796.214 | 0.00 |
| 0.050 | 0.00 | 0.356 | 0.49 | 2.518 | 2.97 | 17.825 | 2.20 | 126.191 | 0.26 | 893.367 | 0.00 |
| 0.056 | 0.00 | 0.399 | 0.59 | 2.825 | 3.01 | 20.000 | 2.34 | 141.589 | 0.12 | 1002.374 | 0.00 |
| 0.063 | 0.00 | 0.448 | 0.69 | 3.170 | 3.00 | 22.440 | 2.47 | 158.866 | 0.05 | 1124.683 | 0.00 |
| 0.071 | 0.00 | 0.502 | 0.80 | 3.557 | 2.93 | 25.179 | 2.56 | 178.250 | 0.00 | 1261.915 | 0.00 |
| 0.080 | 0.00 | 0.564 | 0.91 | 3.991 | 2.82 | 28.251 | 2.62 | 200.000 | 0.00 | 1415.892 | 0.00 |
| 0.089 | 0.00 | 0.632 | 1.03 | 4.477 | 2.67 | 31.698 | 2.64 | 224.404 | 0.00 | 1588.656 | 0.00 |
| 0.100 | 0.00 | 0.710 | 1.16 | 5.024 | 2.50 | 35.566 | 2.59 | 251.785 | 0.00 | 1782.502 | 0.00 |
| 0.112 | 0.00 | 0.796 | 1.30 | 5.637 | 2.31 | 39.905 | 2.50 | 282.508 | 0.00 | 2000.000 | |
| 0.126 | 0.00 | 0.893 | 1.47 | 6.325 | 2.13 | 44.774 | 2.35 | 316.979 | 0.00 | | |
| 0.142 | | 1.002 | | 7.096 | | 50.238 | | 355.656 | | | |

**Operator notes:**

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20529 [W]

**SOP Name:**

**Measured:**
Friday, 27 November 2020 11:43:45 AM

**Sample Source & type:**
Works

**Measured by:**
Andrew Robinson

**Analysed:**
Thursday, 26 November 2020 4:34:27 PM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 325.200 um

**Obscuration:**
29.14 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
0.349 %

**Result Emulation:**
Off

---

**Concentration:**
0.0286 %Vol

**Span :**
2.934

**Uniformity:**
1.02

**Result units:**
Volume

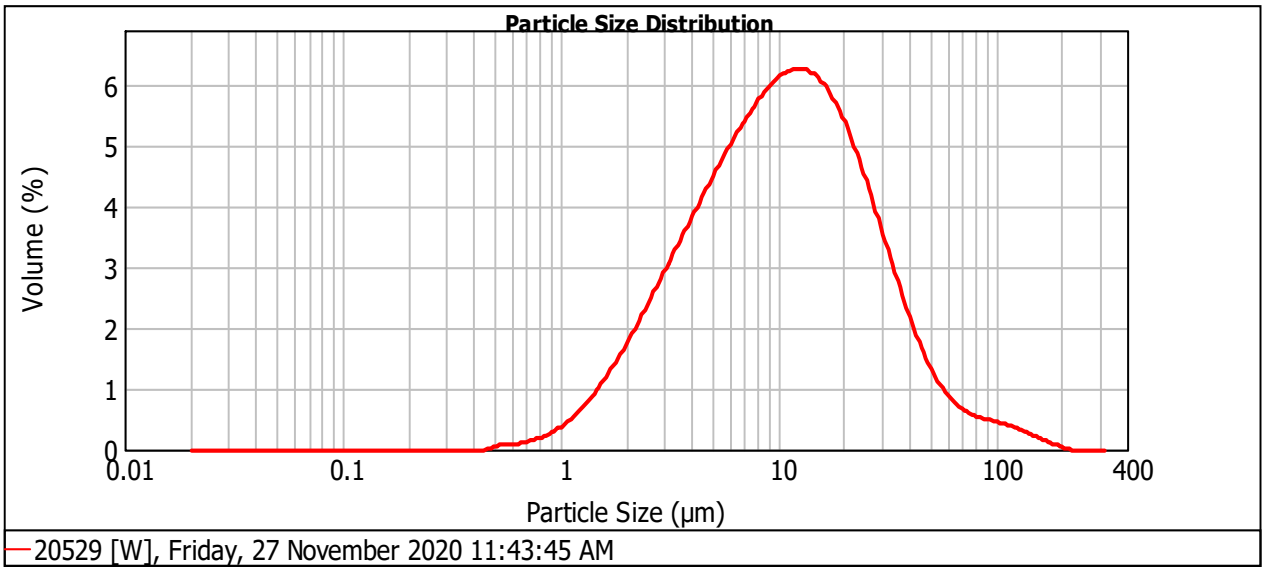
**Specific Surface Area:**
0.941 m²/g

**Surface Weighted Mean D[3,2]:**
6.375 um

**Vol. Weighted Mean D[4,3]:**
16.252 um

---

**d(0.1):** 2.821 um **d(0.5):** 10.540 um **d(0.9):** 33.745 um




| Size (µm) | Volume In % |
|---|---|
| 0.020 | 0.00 |
| 0.022 | 0.00 |
| 0.025 | 0.00 |
| 0.028 | 0.00 |
| 0.032 | 0.00 |
| 0.036 | 0.00 |
| 0.040 | 0.00 |
| 0.045 | 0.00 |
| 0.050 | 0.00 |
| 0.056 | 0.00 |
| 0.063 | 0.00 |
| 0.071 | 0.00 |
| 0.080 | 0.00 |
| 0.089 | 0.00 |
| 0.100 | 0.00 |
| 0.112 | 0.00 |
| 0.126 | 0.00 |
| 0.142 | |

| Size (µm) | Volume In % |
|---|---|
| 0.142 | 0.00 |
| 0.159 | 0.00 |
| 0.178 | 0.00 |
| 0.200 | 0.00 |
| 0.224 | 0.00 |
| 0.252 | 0.00 |
| 0.283 | 0.00 |
| 0.317 | 0.00 |
| 0.356 | 0.00 |
| 0.399 | 0.00 |
| 0.448 | 0.01 |
| 0.502 | 0.06 |
| 0.564 | 0.07 |
| 0.632 | 0.08 |
| 0.710 | 0.12 |
| 0.796 | 0.17 |
| 0.893 | 0.24 |
| 1.002 | |

| Size (µm) | Volume In % |
|---|---|
| 1.002 | 0.33 |
| 1.125 | 0.45 |
| 1.262 | 0.60 |
| 1.416 | 0.77 |
| 1.589 | 0.96 |
| 1.783 | 1.18 |
| 2.000 | 1.42 |
| 2.244 | 1.67 |
| 2.518 | 1.92 |
| 2.825 | 2.19 |
| 3.170 | 2.46 |
| 3.557 | 2.73 |
| 3.991 | 2.99 |
| 4.477 | 3.25 |
| 5.024 | 3.50 |
| 5.637 | 3.75 |
| 6.325 | 3.98 |
| 7.096 | |

| Size (µm) | Volume In % |
|---|---|
| 7.096 | 4.19 |
| 7.962 | 4.38 |
| 8.934 | 4.54 |
| 10.024 | 4.65 |
| 11.247 | 4.71 |
| 12.619 | 4.70 |
| 14.159 | 4.62 |
| 15.887 | 4.46 |
| 17.825 | 4.23 |
| 20.000 | 3.92 |
| 22.440 | 3.56 |
| 25.179 | 3.15 |
| 28.251 | 2.72 |
| 31.698 | 2.28 |
| 35.566 | 1.86 |
| 39.905 | 1.48 |
| 44.774 | 1.15 |
| 50.238 | |

| Size (µm) | Volume In % |
|---|---|
| 50.238 | 0.88 |
| 56.368 | 0.68 |
| 63.246 | 0.54 |
| 70.963 | 0.45 |
| 79.621 | 0.40 |
| 89.337 | 0.36 |
| 100.237 | 0.33 |
| 112.468 | 0.28 |
| 126.191 | 0.23 |
| 141.589 | 0.17 |
| 158.866 | 0.11 |
| 178.250 | 0.06 |
| 200.000 | 0.01 |
| 224.404 | 0.00 |
| 251.785 | 0.00 |
| 282.508 | 0.00 |
| 316.979 | 0.00 |
| 355.656 | |

| Size (µm) | Volume In % |
|---|---|
| 355.656 | 0.00 |
| 399.052 | 0.00 |
| 447.744 | 0.00 |
| 502.377 | 0.00 |
| 563.677 | 0.00 |
| 632.456 | 0.00 |
| 709.627 | 0.00 |
| 796.214 | 0.00 |
| 893.367 | 0.00 |
| 1002.374 | 0.00 |
| 1124.683 | 0.00 |
| 1261.915 | 0.00 |
| 1415.892 | 0.00 |
| 1588.656 | 0.00 |
| 1782.502 | 0.00 |
| 2000.000 | |

**Operator notes:**

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20530 [W]

**SOP Name:**

**Measured:**
Friday, 27 November 2020 12:01:06 PM

**Sample Source & type:**
Works

**Measured by:**
Andrew Robinson

**Analysed:**
Friday, 27 November 2020 12:01:07 PM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 2000.000 um

**Obscuration:**
9.59 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
1.172 %

**Result Emulation:**
Off

---

**Concentration:**
0.0019 %Vol

**Span :**
3.318

**Uniformity:**
1.15

**Result units:**
Volume

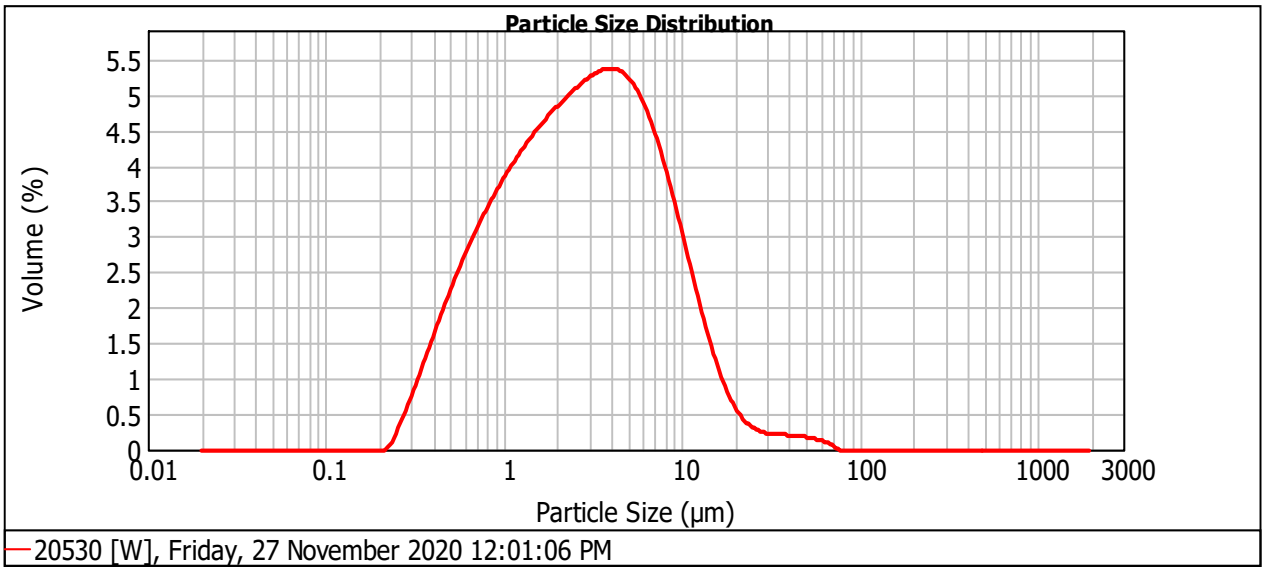
**Specific Surface Area:**
3.78 m²/g

**Surface Weighted Mean D[3,2]:**
1.586 um

**Vol. Weighted Mean D[4,3]:**
4.470 um

---

**d(0.1):** 0.640 um **d(0.5):** 2.731 um **d(0.9):** 9.701 um




| Size (µm) | Volume In % |
|---|---|
| 0.020 | 0.00 |
| 0.022 | 0.00 |
| 0.025 | 0.00 |
| 0.028 | 0.00 |
| 0.032 | 0.00 |
| 0.036 | 0.00 |
| 0.040 | 0.00 |
| 0.045 | 0.00 |
| 0.050 | 0.00 |
| 0.056 | 0.00 |
| 0.063 | 0.00 |
| 0.071 | 0.00 |
| 0.080 | 0.00 |
| 0.089 | 0.00 |
| 0.100 | 0.00 |
| 0.112 | 0.00 |
| 0.126 | 0.00 |
| 0.142 | |

| Size (µm) | Volume In % |
|---|---|
| 0.142 | 0.00 |
| 0.159 | 0.00 |
| 0.178 | 0.00 |
| 0.200 | 0.00 |
| 0.224 | 0.11 |
| 0.252 | 0.34 |
| 0.283 | 0.57 |
| 0.317 | 0.83 |
| 0.356 | 1.09 |
| 0.399 | 1.34 |
| 0.448 | 1.60 |
| 0.502 | 1.84 |
| 0.564 | 2.07 |
| 0.632 | 2.27 |
| 0.710 | 2.47 |
| 0.796 | 2.65 |
| 0.893 | 2.81 |
| 1.002 | |

| Size (µm) | Volume In % |
|---|---|
| 1.002 | 2.97 |
| 1.125 | 3.12 |
| 1.262 | 3.25 |
| 1.416 | 3.38 |
| 1.589 | 3.49 |
| 1.783 | 3.60 |
| 2.000 | 3.69 |
| 2.244 | 3.78 |
| 2.518 | 3.87 |
| 2.825 | 3.94 |
| 3.170 | 4.00 |
| 3.557 | 4.04 |
| 3.991 | 4.03 |
| 4.477 | 3.98 |
| 5.024 | 3.87 |
| 5.637 | 3.70 |
| 6.325 | 3.46 |
| 7.096 | |

| Size (µm) | Volume In % |
|---|---|
| 7.096 | 3.18 |
| 7.962 | 2.84 |
| 8.934 | 2.48 |
| 10.024 | 2.09 |
| 11.247 | 1.71 |
| 12.619 | 1.34 |
| 14.159 | 1.02 |
| 15.887 | 0.74 |
| 17.825 | 0.52 |
| 20.000 | 0.36 |
| 22.440 | 0.26 |
| 25.179 | 0.20 |
| 28.251 | 0.17 |
| 31.698 | 0.16 |
| 35.566 | 0.16 |
| 39.905 | 0.15 |
| 44.774 | 0.14 |
| 50.238 | |

| Size (µm) | Volume In % |
|---|---|
| 50.238 | 0.12 |
| 56.368 | 0.10 |
| 63.246 | 0.08 |
| 70.963 | 0.00 |
| 79.621 | 0.00 |
| 89.337 | 0.00 |
| 100.237 | 0.00 |
| 112.468 | 0.00 |
| 126.191 | 0.00 |
| 141.589 | 0.00 |
| 158.866 | 0.00 |
| 178.250 | 0.00 |
| 200.000 | 0.00 |
| 224.404 | 0.00 |
| 251.785 | 0.00 |
| 282.508 | 0.00 |
| 316.979 | 0.00 |
| 355.656 | |

| Size (µm) | Volume In % |
|---|---|
| 355.656 | 0.00 |
| 399.052 | 0.00 |
| 447.744 | 0.00 |
| 502.377 | 0.00 |
| 563.677 | 0.00 |
| 632.456 | 0.00 |
| 709.627 | 0.00 |
| 796.214 | 0.00 |
| 893.367 | 0.00 |
| 1002.374 | 0.00 |
| 1124.683 | 0.00 |
| 1261.915 | 0.00 |
| 1415.892 | 0.00 |
| 1588.656 | 0.00 |
| 1782.502 | 0.00 |
| 2000.000 | |

**Operator notes:**

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20276 [Water]

**SOP Name:**

**Measured:**
Friday, 6 November 2020 11:28:56 AM

**Sample Source & type:**
Supplier

**Measured by:**
Andrew Robinson

**Analysed:**
Friday, 6 November 2020 11:28:58 AM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 2000.000 um

**Obscuration:**
3.75 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
1.107 %

**Result Emulation:**
Off

---

**Concentration:**
0.0143 %Vol

**Span :**
1.561

**Uniformity:**
0.495

**Result units:**
Volume

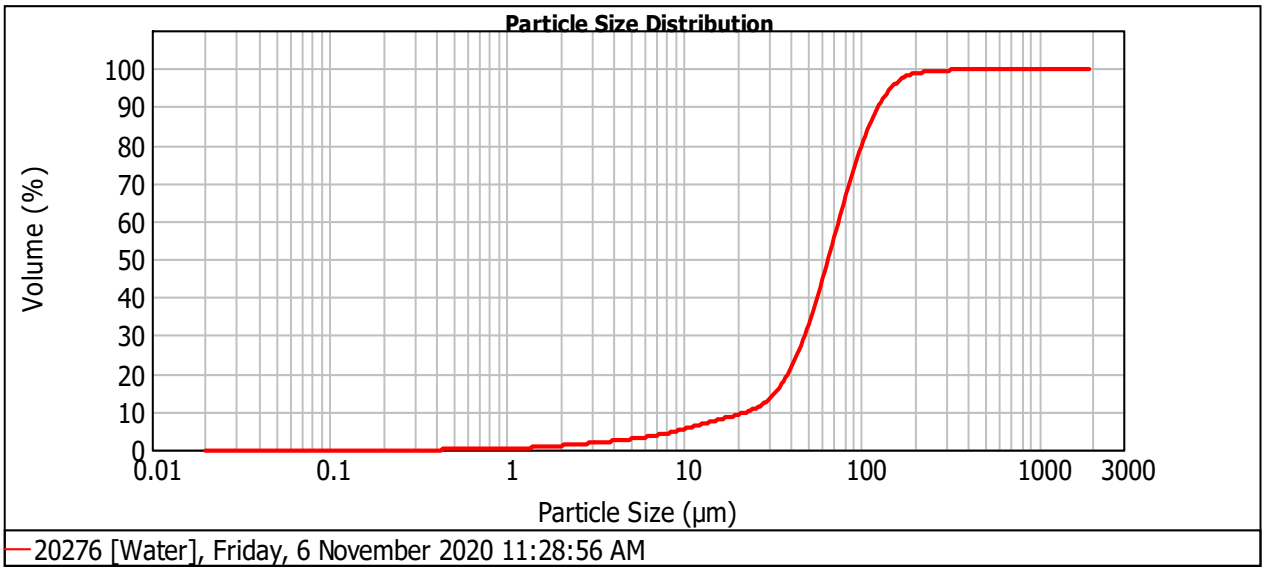
**Specific Surface Area:**
0.216 m²/g

**Surface Weighted Mean D[3,2]:**
27.806 um

**Vol. Weighted Mean D[4,3]:**
71.475 um

---

**d(0.1):** 22.861 um **d(0.5):** 64.644 um **d(0.9):** 123.759 um




| Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.020 | 0.00 | 0.142 | 0.00 | 1.002 | 0.28 | 7.096 | 3.79 | 50.238 | 32.91 | 355.656 | 99.77 |
| 0.022 | 0.00 | 0.159 | 0.00 | 1.125 | 0.36 | 7.962 | 4.27 | 56.368 | 40.29 | 399.052 | 99.91 |
| 0.025 | 0.00 | 0.178 | 0.00 | 1.262 | 0.46 | 8.934 | 4.81 | 63.246 | 48.40 | 447.744 | 100.00 |
| 0.028 | 0.00 | 0.200 | 0.00 | 1.416 | 0.58 | 10.024 | 5.41 | 70.963 | 56.89 | 502.377 | 100.00 |
| 0.032 | 0.00 | 0.224 | 0.00 | 1.589 | 0.71 | 11.247 | 6.05 | 79.621 | 65.30 | 563.677 | 100.00 |
| 0.036 | 0.00 | 0.252 | 0.00 | 1.783 | 0.86 | 12.619 | 6.69 | 89.337 | 73.20 | 632.456 | 100.00 |
| 0.040 | 0.00 | 0.283 | 0.00 | 2.000 | 1.03 | 14.159 | 7.32 | 100.237 | 80.21 | 709.627 | 100.00 |
| 0.045 | 0.00 | 0.317 | 0.00 | 2.244 | 1.21 | 15.887 | 7.93 | 112.468 | 86.08 | 796.214 | 100.00 |
| 0.050 | 0.00 | 0.356 | 0.00 | 2.518 | 1.41 | 17.825 | 8.52 | 126.191 | 90.69 | 893.367 | 100.00 |
| 0.056 | 0.00 | 0.399 | 0.00 | 2.825 | 1.60 | 20.000 | 9.13 | 141.589 | 94.10 | 1002.374 | 100.00 |
| 0.063 | 0.00 | 0.448 | 0.01 | 3.170 | 1.81 | 22.440 | 9.86 | 158.866 | 96.46 | 1124.683 | 100.00 |
| 0.071 | 0.00 | 0.502 | 0.04 | 3.557 | 2.02 | 25.179 | 10.85 | 178.250 | 97.98 | 1261.915 | 100.00 |
| 0.080 | 0.00 | 0.564 | 0.07 | 3.991 | 2.24 | 28.251 | 12.28 | 200.000 | 98.74 | 1415.892 | 100.00 |
| 0.089 | 0.00 | 0.632 | 0.10 | 4.477 | 2.48 | 31.698 | 14.37 | 224.404 | 99.04 | 1588.656 | 100.00 |
| 0.100 | 0.00 | 0.710 | 0.14 | 5.024 | 2.74 | 35.566 | 17.34 | 251.785 | 99.19 | 1782.502 | 100.00 |
| 0.112 | 0.00 | 0.796 | 0.18 | 5.637 | 3.04 | 39.905 | 21.37 | 282.508 | 99.38 | 2000.000 | 100.00 |
| 0.126 | 0.00 | 0.893 | 0.22 | 6.325 | 3.38 | 44.774 | 26.56 | 316.979 | 99.58 | | |

**Operator notes:** *Average of 2 measurements from EGI 2020-068.mea*

# Result Analysis Report

**Sample Name:**
20277 [Water]

**SOP Name:**

**Measured:**
Friday, 6 November 2020 11:50:04 AM

**Sample Source & type:**
Supplier

**Measured by:**
Andrew Robinson

**Analysed:**
Friday, 6 November 2020 11:50:05 AM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 2000.000 um

**Obscuration:**
24.34 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
0.629 %

**Result Emulation:**
Off

---

**Concentration:**
0.0202 %Vol

**Span :**
2.775

**Uniformity:**
0.85

**Result units:**
Volume

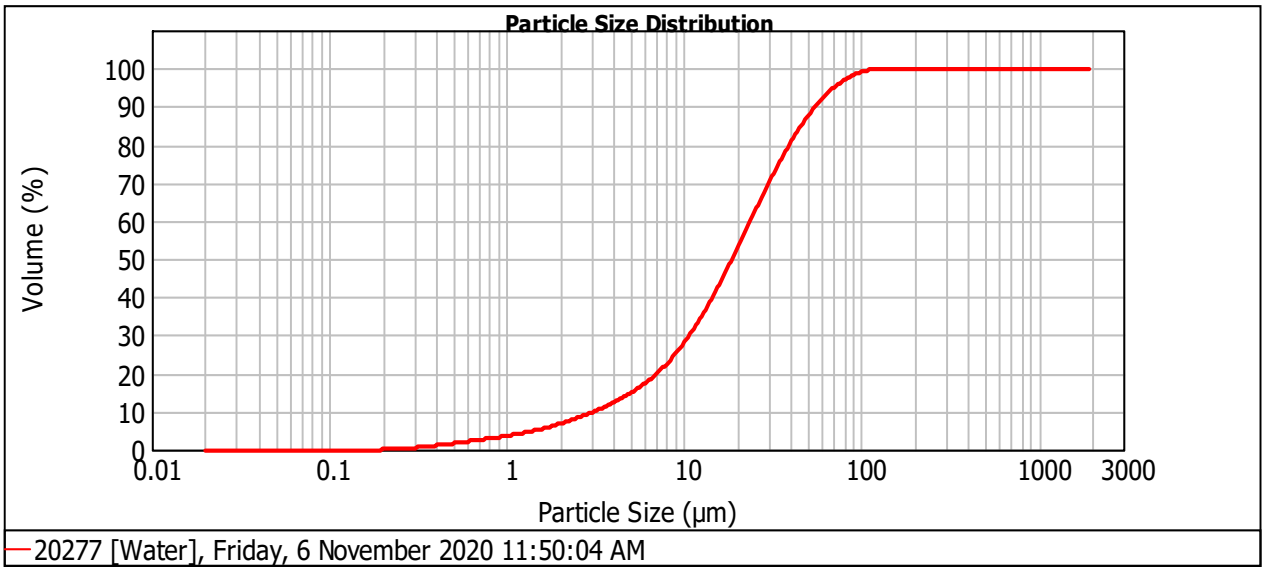
**Specific Surface Area:**
1.04 m²/g

**Surface Weighted Mean D[3,2]:**
5.762 um

**Vol. Weighted Mean D[4,3]:**
24.625 um

---

**d(0.1):** 3.106 um **d(0.5):** 18.548 um **d(0.9):** 54.583 um




| Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.020 | 0.00 | 0.142 | 0.00 | 1.002 | 3.61 | 7.096 | 20.20 | 50.238 | 87.84 | 355.656 | 100.00 |
| 0.022 | 0.00 | 0.159 | 0.00 | 1.125 | 4.01 | 7.962 | 22.50 | 56.368 | 90.78 | 399.052 | 100.00 |
| 0.025 | 0.00 | 0.178 | 0.00 | 1.262 | 4.45 | 8.934 | 25.15 | 63.246 | 93.29 | 447.744 | 100.00 |
| 0.028 | 0.00 | 0.200 | 0.01 | 1.416 | 4.94 | 10.024 | 28.15 | 70.963 | 95.35 | 502.377 | 100.00 |
| 0.032 | 0.00 | 0.224 | 0.09 | 1.589 | 5.50 | 11.247 | 31.53 | 79.621 | 96.99 | 563.677 | 100.00 |
| 0.036 | 0.00 | 0.252 | 0.22 | 1.783 | 6.11 | 12.619 | 35.27 | 89.337 | 98.23 | 632.456 | 100.00 |
| 0.040 | 0.00 | 0.283 | 0.38 | 2.000 | 6.79 | 14.159 | 39.36 | 100.237 | 99.10 | 709.627 | 100.00 |
| 0.045 | 0.00 | 0.317 | 0.59 | 2.244 | 7.54 | 15.887 | 43.74 | 112.468 | 99.66 | 796.214 | 100.00 |
| 0.050 | 0.00 | 0.356 | 0.82 | 2.518 | 8.35 | 17.825 | 48.36 | 126.191 | 99.97 | 893.367 | 100.00 |
| 0.056 | 0.00 | 0.399 | 1.08 | 2.825 | 9.22 | 20.000 | 53.15 | 141.589 | 100.00 | 1002.374 | 100.00 |
| 0.063 | 0.00 | 0.448 | 1.35 | 3.170 | 10.17 | 22.440 | 58.01 | 158.866 | 100.00 | 1124.683 | 100.00 |
| 0.071 | 0.00 | 0.502 | 1.65 | 3.557 | 11.20 | 25.179 | 62.87 | 178.250 | 100.00 | 1261.915 | 100.00 |
| 0.080 | 0.00 | 0.564 | 1.95 | 3.991 | 12.31 | 28.251 | 67.64 | 200.000 | 100.00 | 1415.892 | 100.00 |
| 0.089 | 0.00 | 0.632 | 2.25 | 4.477 | 13.54 | 31.698 | 72.26 | 224.404 | 100.00 | 1588.656 | 100.00 |
| 0.100 | 0.00 | 0.710 | 2.57 | 5.024 | 14.90 | 35.566 | 76.64 | 251.785 | 100.00 | 1782.502 | 100.00 |
| 0.112 | 0.00 | 0.796 | 2.90 | 5.637 | 16.44 | 39.905 | 80.73 | 282.508 | 100.00 | 2000.000 | 100.00 |
| 0.126 | 0.00 | 0.893 | 3.24 | 6.325 | 18.19 | 44.774 | 84.48 | 316.979 | 100.00 | | |

**Operator notes:**

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20278 [Water]

**SOP Name:**

**Measured:**
Friday, 6 November 2020 12:07:29 PM

**Sample Source & type:**
Supplier

**Measured by:**
Andrew Robinson

**Analysed:**
Friday, 6 November 2020 12:07:30 PM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 2000.000 um

**Obscuration:**
45.86 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
0.469 %

**Result Emulation:**
Off

---

**Concentration:**
0.0205 %Vol

**Span :**
8.043

**Uniformity:**
2.48

**Result units:**
Volume

**Specific Surface Area:**
2.2 m²/g

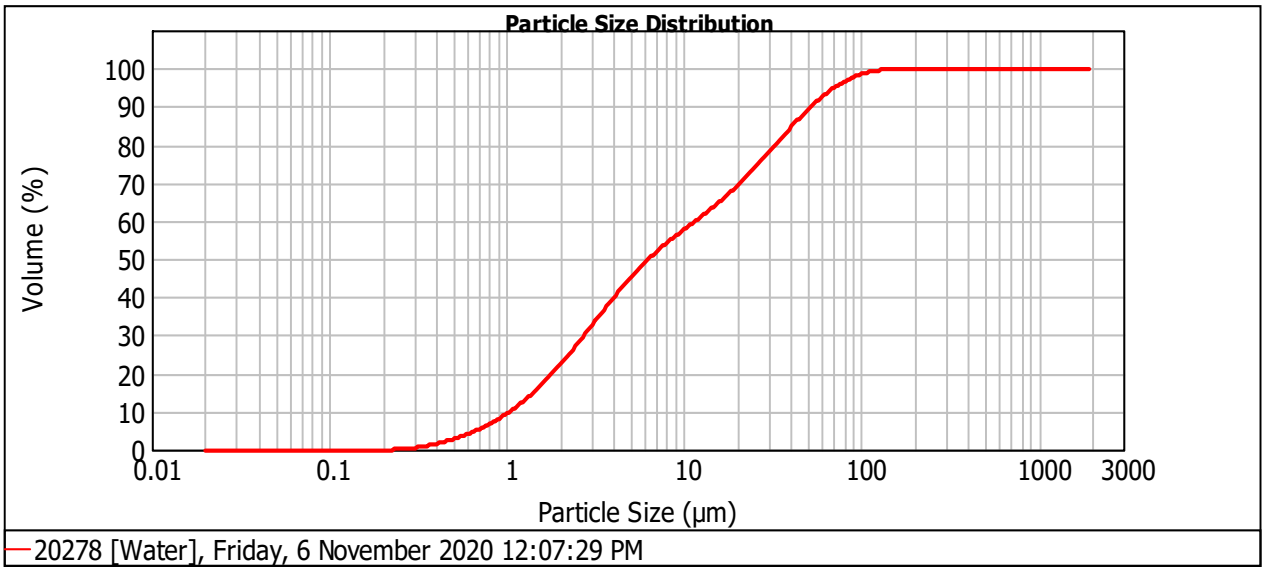
**Surface Weighted Mean D[3,2]:**
2.728 um

**Vol. Weighted Mean D[4,3]:**
18.132 um

---

**d(0.1):** 1.044 um **d(0.5):** 6.293 um **d(0.9):** 51.659 um

---




| Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % | Size (µm) | Vol Under % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.020 | 0.00 | 0.142 | 0.00 | 1.002 | 9.43 | 7.096 | 52.23 | 50.238 | 89.46 | 355.656 | 100.00 |
| 0.022 | 0.00 | 0.159 | 0.00 | 1.125 | 11.08 | 7.962 | 54.21 | 56.368 | 91.61 | 399.052 | 100.00 |
| 0.025 | 0.00 | 0.178 | 0.00 | 1.262 | 12.91 | 8.934 | 56.07 | 63.246 | 93.52 | 447.744 | 100.00 |
| 0.028 | 0.00 | 0.200 | 0.00 | 1.416 | 14.95 | 10.024 | 57.84 | 70.963 | 95.17 | 502.377 | 100.00 |
| 0.032 | 0.00 | 0.224 | 0.00 | 1.589 | 17.18 | 11.247 | 59.59 | 79.621 | 96.56 | 563.677 | 100.00 |
| 0.036 | 0.00 | 0.252 | 0.11 | 1.783 | 19.61 | 12.619 | 61.36 | 89.337 | 97.67 | 632.456 | 100.00 |
| 0.040 | 0.00 | 0.283 | 0.29 | 2.000 | 22.23 | 14.159 | 63.20 | 100.237 | 98.52 | 709.627 | 100.00 |
| 0.045 | 0.00 | 0.317 | 0.60 | 2.244 | 24.99 | 15.887 | 65.13 | 112.468 | 99.15 | 796.214 | 100.00 |
| 0.050 | 0.00 | 0.356 | 0.99 | 2.518 | 27.89 | 17.825 | 67.19 | 126.191 | 99.56 | 893.367 | 100.00 |
| 0.056 | 0.00 | 0.399 | 1.48 | 2.825 | 30.86 | 20.000 | 69.39 | 141.589 | 99.83 | 1002.374 | 100.00 |
| 0.063 | 0.00 | 0.448 | 2.08 | 3.170 | 33.87 | 22.440 | 71.73 | 158.866 | 99.95 | 1124.683 | 100.00 |
| 0.071 | 0.00 | 0.502 | 2.77 | 3.557 | 36.86 | 25.179 | 74.20 | 178.250 | 100.00 | 1261.915 | 100.00 |
| 0.080 | 0.00 | 0.564 | 3.57 | 3.991 | 39.80 | 28.251 | 76.77 | 200.000 | 100.00 | 1415.892 | 100.00 |
| 0.089 | 0.00 | 0.632 | 4.48 | 4.477 | 42.62 | 31.698 | 79.39 | 224.404 | 100.00 | 1588.656 | 100.00 |
| 0.100 | 0.00 | 0.710 | 5.50 | 5.024 | 45.29 | 35.566 | 82.03 | 251.785 | 100.00 | 1782.502 | 100.00 |
| 0.112 | 0.00 | 0.796 | 6.66 | 5.637 | 47.78 | 39.905 | 84.62 | 282.508 | 100.00 | 2000.000 | 100.00 |
| 0.126 | 0.00 | 0.893 | 7.97 | 6.325 | 50.10 | 44.774 | 87.11 | 316.979 | 100.00 | | |

**Operator notes:**

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20529 [W]

**SOP Name:**

**Measured:**
Friday, 27 November 2020 11:43:45 AM

**Sample Source & type:**
Works

**Measured by:**
Andrew Robinson

**Analysed:**
Thursday, 26 November 2020 4:34:27 PM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 325.200 um

**Obscuration:**
29.14 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
0.349 %

**Result Emulation:**
Off

---

**Concentration:**
0.0286 %Vol

**Span :**
2.934

**Uniformity:**
1.02

**Result units:**
Volume

**Specific Surface Area:**
0.941 m²/g

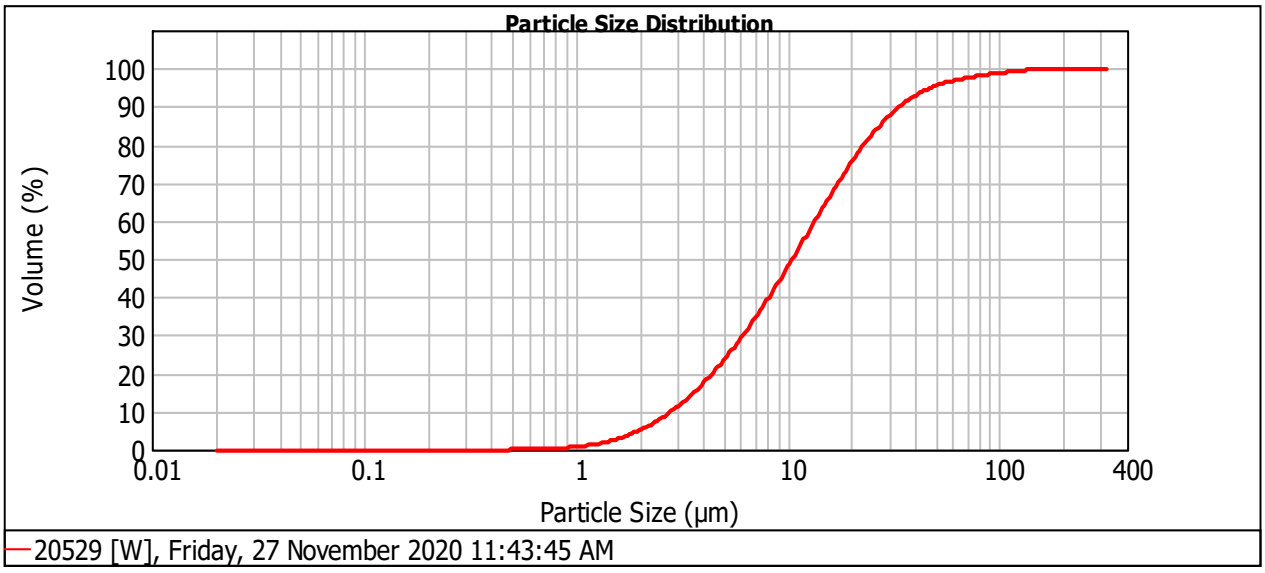
**Surface Weighted Mean D[3,2]:**
6.375 um

**Vol. Weighted Mean D[4,3]:**
16.252 um

---

**d(0.1):** 2.821 um **d(0.5):** 10.540 um **d(0.9):** 33.745 um

---




| Size (µm) | Volume In % |
|---|---|
| 0.020 | 0.00 |
| 0.022 | 0.00 |
| 0.025 | 0.00 |
| 0.028 | 0.00 |
| 0.032 | 0.00 |
| 0.036 | 0.00 |
| 0.040 | 0.00 |
| 0.045 | 0.00 |
| 0.050 | 0.00 |
| 0.056 | 0.00 |
| 0.063 | 0.00 |
| 0.071 | 0.00 |
| 0.080 | 0.00 |
| 0.089 | 0.00 |
| 0.100 | 0.00 |
| 0.112 | 0.00 |
| 0.126 | 0.00 |
| 0.142 | |

| Size (µm) | Volume In % |
|---|---|
| 0.142 | 0.00 |
| 0.159 | 0.00 |
| 0.178 | 0.00 |
| 0.200 | 0.00 |
| 0.224 | 0.00 |
| 0.252 | 0.00 |
| 0.283 | 0.00 |
| 0.317 | 0.00 |
| 0.356 | 0.00 |
| 0.399 | 0.00 |
| 0.448 | 0.00 |
| 0.502 | 0.01 |
| 0.564 | 0.06 |
| 0.632 | 0.07 |
| 0.710 | 0.08 |
| 0.796 | 0.12 |
| 0.893 | 0.17 |
| 1.002 | 0.24 |

| Size (µm) | Volume In % |
|---|---|
| 1.002 | 0.33 |
| 1.125 | 0.45 |
| 1.262 | 0.60 |
| 1.416 | 0.77 |
| 1.589 | 0.96 |
| 1.783 | 1.18 |
| 2.000 | 1.42 |
| 2.244 | 1.67 |
| 2.518 | 1.92 |
| 2.825 | 2.19 |
| 3.170 | 2.46 |
| 3.557 | 2.73 |
| 3.991 | 2.99 |
| 4.477 | 3.25 |
| 5.024 | 3.50 |
| 5.637 | 3.75 |
| 6.325 | 3.98 |
| 7.096 | |

| Size (µm) | Volume In % |
|---|---|
| 7.096 | 4.19 |
| 7.962 | 4.38 |
| 8.934 | 4.54 |
| 10.024 | 4.65 |
| 11.247 | 4.71 |
| 12.619 | 4.70 |
| 14.159 | 4.62 |
| 15.887 | 4.46 |
| 17.825 | 4.23 |
| 20.000 | 3.92 |
| 22.440 | 3.56 |
| 25.179 | 3.15 |
| 28.251 | 2.72 |
| 31.698 | 2.28 |
| 35.566 | 1.86 |
| 39.905 | 1.48 |
| 44.774 | 1.15 |
| 50.238 | |

| Size (µm) | Volume In % |
|---|---|
| 50.238 | 0.88 |
| 56.368 | 0.68 |
| 63.246 | 0.54 |
| 70.963 | 0.45 |
| 79.621 | 0.40 |
| 89.337 | 0.36 |
| 100.237 | 0.33 |
| 112.468 | 0.28 |
| 126.191 | 0.23 |
| 141.589 | 0.17 |
| 158.866 | 0.11 |
| 178.250 | 0.06 |
| 200.000 | 0.01 |
| 224.404 | 0.00 |
| 251.785 | 0.00 |
| 282.508 | 0.00 |
| 316.979 | 0.00 |
| 355.656 | |

| Size (µm) | Volume In % |
|---|---|
| 355.656 | 0.00 |
| 399.052 | 0.00 |
| 447.744 | 0.00 |
| 502.377 | 0.00 |
| 563.677 | 0.00 |
| 632.456 | 0.00 |
| 709.627 | 0.00 |
| 796.214 | 0.00 |
| 893.367 | 0.00 |
| 1002.374 | 0.00 |
| 1124.683 | 0.00 |
| 1261.915 | 0.00 |
| 1415.892 | 0.00 |
| 1588.656 | 0.00 |
| 1782.502 | 0.00 |
| 2000.000 | |

**Operator notes:**

MASTERSIZER 2000

# Result Analysis Report

**Sample Name:**
20530 [W]

**SOP Name:**

**Measured:**
Friday, 27 November 2020 12:01:06 PM

**Sample Source & type:**
Works

**Measured by:**
Andrew Robinson

**Analysed:**
Friday, 27 November 2020 12:01:07 PM

**Sample bulk lot ref:**

**Result Source:**
Edited

---

**Particle Name:**
Default 1.0

**Accessory Name:**
Hydro 2000G (A)

**Analysis model:**
General purpose

**Sensitivity:**
Normal

**Particle RI:**
1.520

**Absorption:**
1

**Size range:**
0.020 to 2000.000 um

**Obscuration:**
9.59 %

**Dispersant Name:**
Water

**Dispersant RI:**
1.330

**Weighted Residual:**
1.172 %

**Result Emulation:**
Off

---

**Concentration:**
0.0019 %Vol

**Span :**
3.318

**Uniformity:**
1.15

**Result units:**
Volume

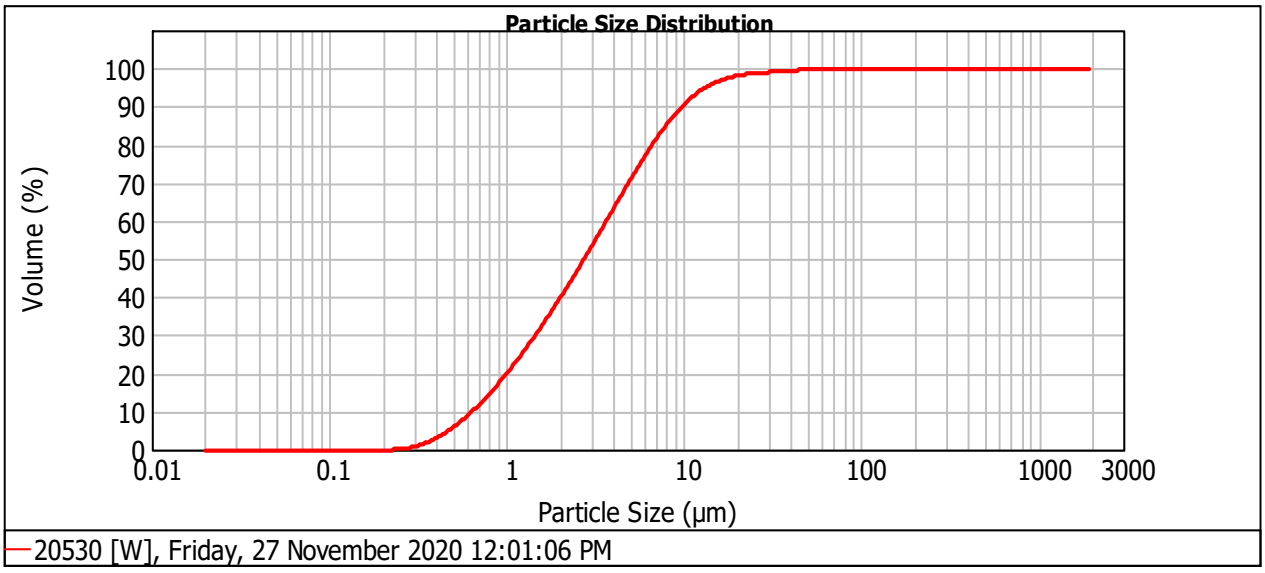
**Specific Surface Area:**
3.78 m²/g

**Surface Weighted Mean D[3,2]:**
1.586 um

**Vol. Weighted Mean D[4,3]:**
4.470 um

---

**d(0.1):** 0.640 um **d(0.5):** 2.731 um **d(0.9):** 9.701 um




| Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % | Size (µm) | Volume In % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.020 | 0.00 | 0.142 | 0.00 | 1.002 | 2.97 | 7.096 | 3.18 | 50.238 | 0.12 | 355.656 | 0.00 |
| 0.022 | 0.00 | 0.159 | 0.00 | 1.125 | 3.12 | 7.962 | 2.84 | 56.368 | 0.10 | 399.052 | 0.00 |
| 0.025 | 0.00 | 0.178 | 0.00 | 1.262 | 3.25 | 8.934 | 2.48 | 63.246 | 0.08 | 447.744 | 0.00 |
| 0.028 | 0.00 | 0.200 | 0.00 | 1.416 | 3.38 | 10.024 | 2.09 | 70.963 | 0.00 | 502.377 | 0.00 |
| 0.032 | 0.00 | 0.224 | 0.11 | 1.589 | 3.49 | 11.247 | 1.71 | 79.621 | 0.00 | 563.677 | 0.00 |
| 0.036 | 0.00 | 0.252 | 0.34 | 1.783 | 3.60 | 12.619 | 1.34 | 89.337 | 0.00 | 632.456 | 0.00 |
| 0.040 | 0.00 | 0.283 | 0.57 | 2.000 | 3.69 | 14.159 | 1.02 | 100.237 | 0.00 | 709.627 | 0.00 |
| 0.045 | 0.00 | 0.317 | 0.83 | 2.244 | 3.78 | 15.887 | 0.74 | 112.468 | 0.00 | 796.214 | 0.00 |
| 0.050 | 0.00 | 0.356 | 1.09 | 2.518 | 3.87 | 17.825 | 0.52 | 126.191 | 0.00 | 893.367 | 0.00 |
| 0.056 | 0.00 | 0.399 | 1.34 | 2.825 | 3.94 | 20.000 | 0.36 | 141.589 | 0.00 | 1002.374 | 0.00 |
| 0.063 | 0.00 | 0.448 | 1.60 | 3.170 | 4.00 | 22.440 | 0.26 | 158.866 | 0.00 | 1124.683 | 0.00 |
| 0.071 | 0.00 | 0.502 | 1.84 | 3.557 | 4.04 | 25.179 | 0.20 | 178.250 | 0.00 | 1261.915 | 0.00 |
| 0.080 | 0.00 | 0.564 | 2.07 | 3.991 | 4.03 | 28.251 | 0.17 | 200.000 | 0.00 | 1415.892 | 0.00 |
| 0.089 | 0.00 | 0.632 | 2.27 | 4.477 | 3.98 | 31.698 | 0.16 | 224.404 | 0.00 | 1588.656 | 0.00 |
| 0.100 | 0.00 | 0.710 | 2.47 | 5.024 | 3.87 | 35.566 | 0.16 | 251.785 | 0.00 | 1782.502 | 0.00 |
| 0.112 | 0.00 | 0.796 | 2.65 | 5.637 | 3.70 | 39.905 | 0.15 | 282.508 | 0.00 | 2000.000 | |
| 0.126 | 0.00 | 0.893 | 2.81 | 6.325 | 3.46 | 44.774 | 0.14 | 316.979 | 0.00 | | |
| 0.142 | | 1.002 | | 7.096 | | 50.238 | | 355.656 | | | |

**Operator notes:**

WWW.GEOCHEMISTRY.COM.AU

# APPENDIX F

# Batch Leach Test Results

*Appendix F: Batch leachate results – Coal Ash*

| Parameter | Unit | Detection Limit | Coal Ash | | | |
|---|---|---|---|---|---|---|
| | | | 20276-1 | 20276-2 | 20276-3 | 20276-4 |
| Target LS | ml/g | - | 25 | 15 | 7.5 | 2 |
| pH | | - | 7.4 | 6.9 | 6.1 | 5.8 |
| EC | dS/m | 0.001 | 0.032 | 0.046 | 0.062 | 0.079 |
| Acidity | mg/l | 1.000 | | | 25 | 13 |
| Alkalinity | mg/l | 1 | 13 | 11 | | |
| Ag | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Al | mg/l | 0.01 | 0.03 | <0.01 | <0.01 | <0.01 |
| As | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| B | mg/l | 0.05 | <0.05 | <0.05 | 0.07 | 0.12 |
| Ba | mg/l | 0.001 | <0.001 | 0.001 | 0.003 | 0.003 |
| Be | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Ca | mg/l | 1 | 1 | 3 | 2 | <1 |
| Cd | mg/l | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Cl | mg/l | 1 | 3 | 5 | 10 | 21 |
| Co | mg/l | 0.001 | <0.001 | 0.002 | 0.005 | <0.001 |
| Cr | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Cu | mg/l | 0.001 | 0.003 | 0.003 | 0.006 | 0.004 |
| F | mg/l | 0.1 | 0.3 | 0.7 | 1.2 | 0.2 |
| Fe | mg/l | 0.05 | 0.23 | 0.2 | 7.91 | 6.47 |
| Hg | mg/l | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| K | mg/l | 1 | <1 | 1 | 2 | 2 |
| Mg | mg/l | 1 | <1 | <1 | <1 | <1 |
| Mn | mg/l | 0.001 | 0.014 | 0.034 | 0.128 | 0.09 |
| Mo | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Na | mg/l | 1 | <1 | 1 | 2 | 3 |
| Ni | mg/l | 0.001 | 0.015 | 0.042 | 0.095 | 0.011 |
| P | mg/l | 1 | <1 | <1 | <1 | <1 |
| Pb | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Sb | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Se | mg/l | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Si | mg/l | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 |
| Sn | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| SO4 | mg/l | 1 | <1 | 2 | 8 | <1 |
| Sr | mg/l | 0.001 | 0.004 | 0.008 | 0.01 | 0.005 |
| Th | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Tl | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| U | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| V | mg/l | 0.01 | 0.02 | <0.01 | <0.01 | <0.01 |
| Zn | mg/l | 0.005 | <0.005 | <0.005 | 0.006 | <0.005 |

*Appendix F: Batch leachate results – Sulphate leach residues*

| Parameter | Unit | Detection Limit | Sulphate digest leach residues | | | |
|---|---|---|---|---|---|---|
| | | | 20277-1 | 20277-2 | 20277-3 | 20277-4 |
| Target LS | ml/g | - | 25 | 10 | 5 | 2 |
| pH | | - | 1.9 | 1.5 | 1.3 | 1.2 |
| EC | dS/m | 0.001 | 11.22 | 20.3 | 38.6 | 47.9 |
| Acidity | mg/l | 1.000 | 1427 | 3363 | 8071 | 9204 |
| Alkalinity | mg/l | 1 | | | | |
| Ag | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Al | mg/l | 0.01 | 14 | 33.3 | 76.8 | 85.5 |
| As | mg/l | 0.001 | 0.002 | 0.003 | 0.008 | 0.022 |
| B | mg/l | 0.05 | 1.46 | 3.35 | 7.67 | 8.88 |
| Ba | mg/l | 0.001 | 0.031 | 0.031 | 0.083 | 0.411 |
| Be | mg/l | 0.001 | <0.001 | 0.002 | 0.004 | 0.004 |
| Ca | mg/l | 1 | 533 | 538 | 538 | 492 |
| Cd | mg/l | 0.0001 | 0.001 | 0.002 | 0.0045 | 0.0053 |
| Cl | mg/l | 1 | 5 | 10 | 18 | 22 |
| Co | mg/l | 0.001 | 0.021 | 0.049 | 0.113 | 0.14 |
| Cr | mg/l | 0.001 | 0.564 | 1.38 | 3.2 | 3.65 |
| Cu | mg/l | 0.001 | 0.611 | 1.41 | 3.42 | 4.03 |
| F | mg/l | 0.1 | 0.6 | <0.1 | <0.1 | ---- |
| Fe | mg/l | 0.05 | 8.12 | 27.6 | 82.9 | 110 |
| Hg | mg/l | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| K | mg/l | 1 | 8 | 18 | 37 | 41 |
| Mg | mg/l | 1 | 18 | 44 | 98 | 109 |
| Mn | mg/l | 0.001 | 1.45 | 3.44 | 7.98 | 8.91 |
| Mo | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Na | mg/l | 1 | 14 | 32 | 71 | 84 |
| Ni | mg/l | 0.001 | 0.179 | 0.46 | 1.34 | 1.96 |
| P | mg/l | 1 | <1 | <1 | <1 | <1 |
| Pb | mg/l | 0.001 | 0.003 | 0.001 | 0.004 | 0.011 |
| Sb | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Se | mg/l | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Si | mg/l | 0.1 | 1.3 | 3.74 | 9.84 | 13 |
| Sn | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| SO4 | mg/l | 1 | 2380 | 4470 | 9770 | 11000 |
| Sr | mg/l | 0.001 | 0.117 | 0.154 | 0.23 | 0.244 |
| Th | mg/l | 0.001 | <0.001 | 0.002 | 0.005 | 0.007 |
| Tl | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| U | mg/l | 0.001 | 0.001 | 0.002 | 0.004 | 0.005 |
| V | mg/l | 0.01 | 0.01 | 1.44 | 3.64 | 8.1 |
| Zn | mg/l | 0.005 | 2.13 | 5.07 | 11.3 | 13.3 |

*Appendix F: Batch leachate results – Metal Hydroxide Precipitation #1 Residue*

| Parameter | Unit | Detection Limit | Metal Hydroxide Precipitation #1 Residue | | | |
|---|---|---|---|---|---|---|
| | | | 20278-1 | 20278-2 | 20278-3 | 20278-4 |
| Target LS | ml/g | - | 25 | 15 | 10 | 5 |
| pH | | - | 8.84 | 9.07 | 9.11 | 9.19 |
| EC | dS/m | 0.001 | 4.98 | 6.63 | 8.66 | 13.48 |
| Acidity | mg/l | 1.000 | | | | |
| Alkalinity | mg/l | 1 | 20 | 28 | 20 | 21 |
| Ag | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Al | mg/l | 0.01 | 3.04 | 2.92 | 2.57 | 1.2 |
| As | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| B | mg/l | 0.05 | 0.05 | <0.05 | <0.05 | 0.05 |
| Ba | mg/l | 0.001 | 0.135 | 0.201 | 0.244 | 0.488 |
| Be | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Ca | mg/l | 1 | 976 | 1150 | 1470 | 2190 |
| Cd | mg/l | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Cl | mg/l | 1 | 1040 | 1520 | 2760 | 4610 |
| Co | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Cr | mg/l | 0.001 | 0.034 | 0.007 | <0.001 | <0.001 |
| Cu | mg/l | 0.001 | 0.006 | 0.003 | 0.002 | 0.005 |
| F | mg/l | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Fe | mg/l | 0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Hg | mg/l | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| K | mg/l | 1 | 4 | 6 | 8 | 16 |
| Mg | mg/l | 1 | 2 | 2 | 3 | 4 |
| Mn | mg/l | 0.001 | 0.002 | <0.001 | 0.002 | 0.011 |
| Mo | mg/l | 0.001 | 0.002 | 0.002 | 0.003 | 0.003 |
| Na | mg/l | 1 | 115 | 190 | 268 | 516 |
| Ni | mg/l | 0.001 | 0.001 | <0.001 | <0.001 | <0.001 |
| P | mg/l | 1 | <1 | <1 | <1 | <1 |
| Pb | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Sb | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Se | mg/l | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Si | mg/l | 0.1 | 0.16 | 0.14 | 0.2 | 0.41 |
| Sn | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| SO4 | mg/l | 1 | 788 | 804 | 1260 | 1140 |
| Sr | mg/l | 0.001 | 0.574 | 0.797 | 1.06 | 1.81 |
| Th | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Tl | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| U | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| V | mg/l | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Zn | mg/l | 0.005 | 0.015 | 0.015 | 0.017 | 0.006 |

*Appendix F: Batch leachate results – Artificial Solution #2 Neutralisation #1 Residue*

| Parameter | | Detection Limit | Artificial Solution #2 Neutralisation #1 Residue | | | | |
|---|---|---|---|---|---|---|---|
| | | | 20529-1 | 20529-2 | 20529-3 | 20529-4 | 20529-5 |
| Target LS | ml/g | - | 25 | 15 | 10 | 8 | 6 |
| pH | | - | 7.8 | 7.6 | 7.5 | 7.1 | 6.9 |
| EC | dS/m | 0.001 | 14.97 | 22.3 | 31.1 | 37.3 | 42.2 |
| Acidity | mg/l | 1.000 | | | | | |
| Alkalinity | mg/l | 1 | 17 | 16 | 19 | 68 | 19 |
| Ag | mg/l | 0.001 | 0.004 | 0.002 | <0.010 | <0.010 | <0.010 |
| Al | mg/l | 0.01 | 0.03 | 0.02 | <0.10 | <0.10 | <0.10 |
| As | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| B | mg/l | 0.05 | 0.05 | 0.06 | <0.10 | <0.10 | <0.10 |
| Ba | mg/l | 0.001 | 1.76 | 2.85 | 3.11 | 3.37 | 3.46 |
| Be | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| Ca | mg/l | 1 | 2410 | 4410 | 6400 | 6870 | 8130 |
| Cd | mg/l | 0.0001 | <0.0001 | <0.0001 | <0.0010 | <0.0010 | <0.0010 |
| Cl | mg/l | 1 | 4810 | 6940 | 9610 | 12700 | 14600 |
| Co | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| Cr | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| Cu | mg/l | 0.001 | 0.004 | 0.009 | 0.021 | 0.045 | 0.068 |
| F | mg/l | 0.1 | <0.1 | 0.1 | 0.1 | 0.1 | 0.2 |
| Fe | mg/l | 0.05 | <0.05 | <0.05 | <0.10 | <0.10 | <0.10 |
| Hg | mg/l | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| K | mg/l | 1 | 3 | 5 | 7 | 14 | 11 |
| Mg | mg/l | 1 | 137 | 134 | 138 | 125 | 127 |
| Mn | mg/l | 0.001 | 0.14 | 0.197 | 0.25 | 0.308 | 0.262 |
| Mo | mg/l | 0.001 | 0.002 | 0.003 | 0.01 | 0.012 | 0.017 |
| Na | mg/l | 1 | 84 | 144 | 210 | 271 | 322 |
| Ni | mg/l | 0.001 | <0.001 | 0.001 | <0.010 | <0.010 | <0.010 |
| P | mg/l | 1 | <1 | <1 | <1 | <1 | <1 |
| Pb | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| Sb | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| Se | mg/l | 0.01 | <0.01 | <0.01 | <0.10 | <0.10 | <0.10 |
| Si | mg/l | 0.1 | 0.14023 | 0.280461 | <0.05 | <1 | <1 |
| Sn | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| SO4 | mg/l | 1 | 2 | 3 | <10 | <10 | 12 |
| Sr | mg/l | 0.001 | 1.39 | 2.25 | 3.01 | 3.88 | 4.58 |
| Th | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| Tl | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| U | mg/l | 0.001 | <0.001 | <0.001 | <0.010 | <0.010 | <0.010 |
| V | mg/l | 0.01 | 0.01 | <0.01 | <0.01 | <0.1 | <0.10 |
| Zn | mg/l | 0.005 | 0.108 | 0.126 | 0.147 | <0.050 | 0.15 |

*Appendix F: Batch leachate results – Bulk Crystallisation Slurry Residue*

| Parameter | | Detection Limit | Bulk Crystallisation Slurry | | | | |
|---|---|---|---|---|---|---|---|
| | | | 20530-1 | 20530-2 | 20530-3 | 20530-4 | 20530-5 |
| Target LS | ml/g | | 10 | 5 | 2 | 1 | 0.5 |
| pH | | - | 4.6 | 4.3 | 3.7 | 3.4 | 3.1 |
| EC | dS/m | 0.001 | 102.2 | 144.6 | 171.3 | 169.8 | 170.2 |
| Acidity | mg/l | 1.000 | 94 | 178 | 365 | 606 | 1030 |
| Alkalinity | mg/l | 1 | | | | | |
| Ag | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Al | mg/l | 0.01 | 17.2 | 34.3 | 74.6 | 110 | 184 |
| As | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| B | mg/l | 0.05 | <1.00 | <1.00 | <1.00 | <1.00 | <1.00 |
| Ba | mg/l | 0.001 | 0.232 | 0.193 | 0.168 | 0.252 | 0.315 |
| Be | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Ca | mg/l | 1 | 60 | 93 | 88 | 82 | 56 |
| Cd | mg/l | 0.0001 | <0.0100 | <0.0100 | <0.0100 | <0.0100 | <0.0100 |
| Cl | mg/l | 1 | 34500 | 70600 | 131000 | 140000 | ---- |
| Co | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Cr | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Cu | mg/l | 0.001 | <0.100 | 0.1 | 0.182 | 0.285 | 0.561 |
| F | mg/l | 0.1 | 2.2 | 3.9 | 3.8 | 4.6 | ---- |
| Fe | mg/l | 0.05 | <1.00 | <1.00 | <1.00 | <1.00 | <1.00 |
| Hg | mg/l | 0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0001 |
| K | mg/l | 1 | 98 | 179 | 418 | 808 | 1610 |
| Mg | mg/l | 1 | 20 | 39 | 88 | 171 | 347 |
| Mn | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | 0.114 |
| Mo | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Na | mg/l | 1 | 34000 | 64900 | 130000 | 126000 | 130000 |
| Ni | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | 0.237 | 0.484 |
| P | mg/l | 1 | <5 | <10 | <10 | <10 | <10 |
| Pb | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Sb | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Se | mg/l | 0.01 | <1.00 | <1.00 | <1.00 | <1.00 | <1.00 |
| Si | mg/l | 0.1 | 2.103457 | <10 | 6.310371 | 20.89434 | 43.2 |
| Sn | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| SO4 | mg/l | 1 | 16600 | 33600 | 56500 | 65100 | 73000 |
| Sr | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Th | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Tl | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| U | mg/l | 0.001 | <0.100 | <0.100 | <0.100 | <0.100 | <0.100 |
| Zn | mg/l | 0.01 | <0.500 | 0.58 | 1.06 | 2.17 | 2.48 |