**SORPTION OF CESIUM ONTO THE MINERAL PHASES AND CEMENT OF CONCRETE AND DESORPTION INTO SIMPLE SALT SOLUTIONS**

Figure data

Fig 2.

|  |  |
| --- | --- |
| Time (Min) | cpm |
| 1 | 1199.333333 |
| 10 | 157 |
| 30 | 94 |
| 55 | 78 |
| 1200 | 101 |
| Kd= | 12.33333333 |

Fig. 3.

|  |  |
| --- | --- |
| Tim (min) | cpm |
| 13 | 107.1 |
| 27 | 135.8 |
| 44 | 146.4 |
| 63 | 149.6 |
| 82 | 152.4 |

min = minute

cpm = counts per minute

Fig. 4. top

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Initial | 1st DECON | 2nd DECON | TOTAL | Initial | 1st DECON | 2nd DECON | 1st Decon | 2nd Decon |
|  | Contam | AVERAGE | AVERAGE |  | Contam | AVERAGE | AVERAGE | Kd | Kd |
|  | Average |  |  |  | Average |  |  |  |  |
|  | Counts/g / 1000 | Counts/g / 1000 | Counts/g / 1000 | Kd | Counts/g | Counts/g | Counts/g |  |  |
| Albite | 170 | 65 | 38 | 92.6651 | 169786 | 65375 | 38232 | 11.2 | 25.2 |
| Biotite | 179 | 132 | 95 | 119.321 | 179489 | 132299 | 95164 | 51.2 | 46.8 |
| Hornblend | 108 | 58 | 43 | 23.7763 | 108355 | 57907 | 43323 | 18.3 | 47.5 |
| Orthoclase | 123 | 32 | 12 | 26.3678 | 122564 | 31593 | 12418 | 6.4 | 11.9 |
| Quartz | 61 | 7 | 2 | 7.62714 | 60607 | 7375 | 1518 | 2.5 | 4.6 |
| Fe2O3 (Hematite) | 1 | 1 | 0 | 0.11641 | 1301 | 529 | 308 | 5.4 | 12.0 |
| Fe3O4 (Magnetite) | 52 | 36 | 32 | 20.5238 | 51657 | 36172 | 31513 | 13.8 | 48.7 |
| FeOOH (Geothite) | 5 | 1 | 0 | 0.48911 | 5136 | 944 | 46 | 1.4 | 0.3 |
| CSS (Coarse grained Quartzite) | 39 | 23 | 15 | 10.8229 | 38952 | 22716 | 14715 | 7.1 | 9.3 |
| MF (Amphibolite and gneiss) | 61 | 52 | 51 | 28.5646 | 61274 | 51901 | 50743 | 36.9 | 300.0 |
| OSS (fine-grained sandstone&quartzite) | 48 | 35 | 30 | 13.8366 | 48035 | 34917 | 30302 | 16.7 | 41.0 |
| P (Granite) | 68 | 62 | 65 | 35.9827 | 68296 | 62268 | 65222 | 75.2 | 300.0 |
| QZ (Quartz & Chert) | 40 | 13 | 8 | 6.90536 | 40405 | 12691 | 7926 | 3.4 | 12.4 |
| SS ("chalky" Sandstone) | 58 | 52 | 49 | 27.2117 | 57643 | 51588 | 49493 | 53.9 | 242.9 |
| **Montmorillonite Clay** | 385 | 236 | 0 | 200.3 | 384984 | 235770 |  | 65 |  |

Fig 4. Bottom

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1st DECON | 2nd DECON | TOTAL |
|  | AVERAGE | AVERAGE | DECON |
|  | % Removed | % Removed |  |
|  |  |  |  |
| **Albite** | 61.5% | 41.5% | 77.5% |
| **Biotite** | 26.3% | 28.1% | 47.0% |
| **Hornblend** | 46.6% | 25.2% | 60.0% |
| **Orthoclase** | 74.2% | 60.7% | 89.9% |
| **Quartz** | 87.8% | 79.4% | 97.5% |
| **Fe2O3 (Hematite)** | 59.3% | 43.7% | 77.1% |
| **Fe3O4 (Magnetite)** | 29.9% | 13.0% | 38.9% |
| **FeOOH (Geothite)** | 81.7% | 95.4% | 99.1% |
| **CSS** (Coarse grained Quartzite) | 41.7% | 35.2% | 62.2% |
| **MF** (Amphibolite and gneiss) | 15.3% | 2.2% | 17.1% |
| **OSS** (fine-grained sandstone&quartzite) | 27.6% | 13.6% | 37.4% |
| **P** (Granite) | 8.8% | 0.0% | 4.6% |
| **QZ** (Quartz & Chert) | 68.8% | 37.6% | 81.1% |
| **SS** ("chalky" Sandstone) | 10.6% | 4.3% | 14.4% |
| **Montmorillonite Clay** | 38.0% |  |  |

Fig. 5 TOP

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Coarse Aggregate (fraction removed) | | | |  |  |  |  |
| aging time(min) | aging time (hr) | 0.1 K | std dev | 0.5 K | std dev | 0.1 N | std dev | 0.5 N | std dev |
| 2 | 0.033333333 | 0.35 | 0.06 | 0.41 | 0.04 | 0.62 | 0.03 | 0.39 | 0.05 |
| 6 | 0.1 | 0.28 | 0.09 | 0.47 | 0.12 | 0.44 | 0.06 | 0.46 | 0.08 |
| 16 | 0.266666667 | 0.33 | 0.01 | 0.37 | 0.09 | 0.34 | 0.09 | 0.35 | 0.02 |
| 48 | 0.8 | 0.15 | 0.04 | 0.27 | 0.04 | 0.20 | 0.06 | 0.32 | 0.06 |
| 120 | 2 | 0.11 | 0.04 | 0.20 | 0.02 | 0.22 | 0.05 | 0.30 | 0.02 |

|  |  |
| --- | --- |
|  | Aging Time |
| % Removed | (hr) |
|  | Contam-Decon |
| 23.5% | 0.833 |
| 21.9% | 6.05 |
| 16.1% | 24.4 |
| 21.5% | 48.0 |
| 12.9% | 168 |
| 9.3% | 388 |
| 17.5% | 1032 |

hr = hour

std dev = standard deviation

Figure 5 Bottom

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Fine Aggregate | | | |  |  |  |  |
| aging time (hr) | aging time (min) | 0.1 N | St dev | 0.5 N | St dev | 0.1 N | St dev | 0.5 N | St dev |
| 0.033333333 | 2 | 14.73 | 0.88 | 31.55 | 0.53 | 25.49 | 0.50 | 41.49 | 1.07 |
| 0.1 | 6 | 14.34 | 0.30 | 30.25 | 0.82 | 25.33 | 0.96 | 40.31 | 0.89 |
| 0.266666667 | 16 | 13.16 | 0.55 | 28.34 | 0.65 | 23.90 | 1.38 | 38.06 | 0.41 |
| 0.8 | 48 | 11.58 | 0.27 | 25.61 | 1.78 | 21.27 | 1.25 | 36.59 | 0.95 |
| 2 | 120 | 8.99 | 0.68 | 25.33 | 0.90 | 21.27 | 1.25 | 33.41 | 0.97 |

N = normality

St dev = standard deviation

min = minute

hr = hour

Fig. 6

1 hr data

|  |  |
| --- | --- |
| Sample ID | % removed |
|  | Size |
|  |  |
| 2115-63-Q1R-CA1-1hr | 8.8% |
| 2115-63-Q2R-CA1-1hr | 15.6% |
| 2115-63-Q3R-CA1-1hr | 23.5% |
| 0.01 M TSPP/1M NH4Cl | 32% |
| 0.1M NH4Cl | 40% |

48 hr data

|  |  |
| --- | --- |
| Sample ID | % removed |
| 2115-63-Q1R-CA1-48hr | 3.1% |
| 2115-63-Q2R-CA1-48hr | 11.6% |
| 2115-63-Q3R-CA1-48hr | 14.0% |
| 0.01 M TSPP/1M NH4Cl | 19% |
| 0.1M NH4Cl | 17% |

Figure 7.

|  |  |  |
| --- | --- | --- |
| Test | % removed | Stdev |
| CA-0.1 KCl | 30.79 | 2.15 |
| CA-0.5 KCl | 47.08 | 0.93 |
| CA-1.0 KCl | 50.21 | 4.59 |
| CA-0.1 NH4Cl | 40.79 | 9.82 |
| CA-0.5 NH4Cl | 46.91 | 7.94 |
| CA-1.0 NH4Cl | 46.87 | 7.11 |
| FA-0.1 KCl | 15.21 | 2.02 |
| FA-0.5 KCl | 32.00 | 0.60 |
| FA-1.0 KCl | 37.72 | 0.59 |
| FA-0.1 NH4Cl | 28.05 | 1.71 |
| FA-0.5 NH4Cl | 38.91 | 1.83 |
| FA-1.0 NH4Cl | 42.95 | 2.44 |

KCl = potassium chloride, the number before is the molarity of the solution

NH4Cl = ammonium chlorine, the number before is the molarity of the solution

CA = coarse aggregate

FA = fine aggregate

Stdev = standard deviation