

Electronic Supplementary Table: $^{40}\text{Ar}/^{39}\text{Ar}$ analytical data for supergene alunite and Mn-oxide samples. IA: integrated age, PA: plateau age, IIA: inverse isochron age. Data in italics were excluded from isochron analysis. Age uncertainties are presented at 2σ levels.

| Step | Laser Pwr | $^{36}\text{Ar}/^{39}\text{Ar}$ | $^{37}\text{Ar}/^{39}\text{Ar}$ | $^{38}\text{Ar}/^{39}\text{Ar}$ | $^{40*}\text{Ar}/^{39}\text{Ar}$ | Mol ^{39}Ar | % $^{40}\text{Ar}^*$ | Age (Ma) | $\pm (2\sigma)$ |
|---|-----------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|----------------------|----------------------|----------|-----------------|
| Alunite samples | | | | | | | | | |
| Sample DCA-90 | | | | | | | | | |
| A | 1 | 6.235 | 0.031 | 0.045 | 24.404 | 0.050 | 1.300 | 56.4 | 17.5 |
| B | 2 | 0.909 | 0.013 | 0.046 | 9.911 | 0.366 | 3.600 | 23.1 | 2.6 |
| C | 2.5 | 0.304 | 0.009 | 0.047 | 8.565 | 0.491 | 8.700 | 20.0 | 0.9 |
| D | 3 | 0.273 | 0.008 | 0.047 | 9.118 | 0.772 | 10.100 | 21.3 | 0.8 |
| E | 3.5 | 0.207 | 0.011 | 0.045 | 8.829 | 0.670 | 12.600 | 20.6 | 0.6 |
| F | 4 | 0.115 | 0.008 | 0.043 | 8.795 | 0.434 | 20.500 | 20.5 | 0.5 |
| IA = 28.0 ± 0.3 Ma; J = 0.0012971 ± 0.0000068 | | | | | | | | | |
| PA = 20.6 ± 1.0 Ma (100% released gas) | | | | | | | | | |
| IIA = 19.8 ± 1.0 Ma, n = 6, MSWD = 0.55 | | | | | | | | | |
| Sample DCA-92 | | | | | | | | | |
| A | 1 | 5.149 | 0.097 | 0.128 | 35.789 | 0.016 | 2.300 | 82.5 | 21.6 |
| B | 2 | 1.376 | 0.013 | 0.039 | 12.431 | 0.273 | 3.000 | 29.1 | 3.9 |
| C | 2.5 | 0.280 | 0.012 | 0.043 | 8.925 | 0.518 | 9.700 | 20.9 | 0.9 |
| D | 3 | 0.149 | 0.011 | 0.042 | 8.612 | 0.646 | 16.300 | 20.2 | 0.5 |
| E | 3.5 | 0.147 | 0.011 | 0.043 | 8.386 | 0.841 | 16.200 | 19.7 | 0.5 |
| F | 4 | 0.084 | 0.010 | 0.044 | 8.302 | 1.025 | 25.100 | 19.5 | 0.3 |
| G | 4.5 | 0.104 | 0.012 | 0.045 | 8.365 | 0.737 | 21.400 | 19.6 | 0.3 |
| H | 5 | 0.087 | 0.012 | 0.045 | 9.086 | 0.185 | 26.000 | 21.3 | 0.3 |
| IA = 20.8 ± 0.7 Ma; J = 0.001305 ± 0.0000068 | | | | | | | | | |
| PA = 19.7 ± 0.5 Ma (89% released gas) | | | | | | | | | |
| IIA = 18.7 ± 0.6 Ma, n = 7, MSWD = 0.31 | | | | | | | | | |
| Sample DCA-94 | | | | | | | | | |
| A | 1 | 5.088 | 0.113 | 0.056 | 17.728 | 0.033 | 1.200 | 40.3 | 14.6 |
| B | 2 | 1.255 | 0.021 | 0.034 | 6.942 | 0.216 | 1.800 | 15.9 | 3.5 |
| C | 2.5 | 0.226 | 0.013 | 0.042 | 8.437 | 0.384 | 11.200 | 19.3 | 0.6 |
| D | 3 | 0.085 | 0.007 | 0.043 | 8.798 | 0.509 | 25.800 | 20.1 | 0.3 |
| E | 3.5 | 0.060 | 0.010 | 0.041 | 8.834 | 0.556 | 33.200 | 20.2 | 0.2 |
| F | 4 | 0.124 | 0.012 | 0.042 | 8.917 | 0.534 | 19.600 | 20.4 | 0.4 |
| G | 4.5 | 0.073 | 0.010 | 0.048 | 8.702 | 0.408 | 28.700 | 19.9 | 0.3 |
| H | 5 | 0.067 | 0.012 | 0.043 | 8.867 | 0.378 | 30.900 | 20.3 | 0.2 |
| I | 5.5 | 0.079 | 0.016 | 0.043 | 8.797 | 0.326 | 27.400 | 20.1 | 0.4 |
| J | 6 | 0.034 | 0.009 | 0.044 | 9.069 | 0.311 | 47.600 | 20.7 | 0.2 |
| K | 6.5 | 0.023 | 0.008 | 0.044 | 9.682 | 0.368 | 59.100 | 22.1 | 0.1 |
| IA = 20.2 ± 0.5 Ma; J = 0.0012709 ± 0.0000066 | | | | | | | | | |
| PA = 20.3 ± 0.4 Ma (91% released gas) | | | | | | | | | |
| IIA = 20.2 ± 0.4 Ma, n = 9, MSWD = 0.91 | | | | | | | | | |
| Sample DCM-651B | | | | | | | | | |
| A | 1 | 7.754 | 0.037 | 0.078 | 33.403 | 0.031 | 1.400 | 70.3 | 21.5 |
| B | 1.5 | 2.504 | 0.016 | 0.041 | 17.178 | 0.097 | 2.300 | 36.5 | 6.6 |
| C | 2 | 5.272 | 0.009 | 0.074 | 28.675 | 0.182 | 1.800 | 60.5 | 13.7 |
| D | 2.5 | 2.105 | 0.003 | 0.056 | 17.346 | 0.299 | 2.700 | 36.8 | 5.5 |
| E | 3 | 0.865 | 0.002 | 0.045 | 12.179 | 0.332 | 4.500 | 25.9 | 2.2 |
| F | 3.5 | 0.505 | 0.004 | 0.046 | 10.660 | 0.295 | 6.700 | 22.7 | 1.3 |

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| G | 4 | 0.383 | 0.001 | 0.048 | 10.505 | 0.307 | 8.500 | 22.4 | 1.0 |
| H | 4.5 | 0.363 | 0.001 | 0.042 | 10.110 | 0.349 | 8.600 | 21.6 | 1.0 |
| I | 5 | 0.272 | 0.002 | 0.046 | 9.971 | 0.300 | 11.000 | 21.3 | 0.7 |
| J | 5.5 | 0.224 | 0.001 | 0.047 | 9.794 | 0.387 | 12.900 | 20.9 | 0.6 |
| K | 6 | 0.183 | 0.003 | 0.046 | 9.694 | 0.357 | 15.200 | 20.7 | 0.5 |

IA = 27 ± 2 Ma; J = 0.0011862 ± 0.0000062

PA = 21.2 ± 0.9 Ma (79% released gas)

IIA = 19.2 ± 1.0 Ma, n = 11, MSWD = 0.063

Sample DCM-449

| | | | | | | | | | |
|---|-----|-------|--------|-------|--------|-------|--------|------|-----|
| A | 1 | 1.713 | 0.007 | 0.037 | 14.102 | 0.016 | 2.700 | 31.7 | 5.8 |
| B | 2 | 0.071 | 0.001 | 0.044 | 11.580 | 0.249 | 35.500 | 26.0 | 0.3 |
| C | 2.5 | 0.026 | 0.000 | 0.045 | 11.467 | 0.363 | 60.300 | 25.8 | 0.1 |
| D | 3 | 0.013 | -0.001 | 0.046 | 11.390 | 0.439 | 74.500 | 25.6 | 0.1 |
| E | 3.5 | 0.008 | 0.001 | 0.045 | 11.428 | 0.418 | 83.100 | 25.7 | 0.1 |
| F | 4 | 0.012 | 0.002 | 0.045 | 11.436 | 0.179 | 75.700 | 25.7 | 0.1 |
| G | 4.5 | 0.006 | 0.016 | 0.047 | 11.452 | 0.160 | 86.900 | 25.8 | 0.1 |
| H | 5 | 0.008 | 0.000 | 0.044 | 11.506 | 0.062 | 82.600 | 25.9 | 0.1 |

IA = 25.8 ± 0.3 Ma; J = 0.0012528 ± 0.0000065

PA = 25.7 ± 0.3 Ma (100% released gas)

IIA = 25.7 ± 0.3 Ma, n = 8, MSWD = 0.63

Sample DCM-448A

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 1.5 | 2.040 | 0.035 | 0.056 | 27.207 | 0.160 | 4.300 | 29.1 | 0.9 |
| B | 2 | 0.188 | 0.018 | 0.058 | 23.820 | 0.158 | 30.000 | 25.5 | 0.2 |
| C | 2.5 | 0.202 | 0.004 | 0.049 | 24.127 | 0.216 | 28.800 | 25.8 | 0.2 |
| D | 3 | 0.235 | 0.020 | 0.048 | 23.914 | 0.085 | 25.600 | 25.6 | 0.2 |
| E | 3.5 | 0.272 | 0.062 | 0.047 | 23.758 | 0.049 | 22.800 | 25.4 | 0.3 |

IA = 26.5 ± 0.5 Ma; J = 0.0005965 ± 0.0000035

PA = 25.6 ± 0.4 Ma (76% released gas)

IIA = 25.2 ± 0.4 Ma, n = 5, MSWD = 0.8

Sample DCA-24C1

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 1 | 8.922 | 0.118 | 0.120 | 46.367 | 0.043 | 1.700 | 90.5 | 7.2 |
| B | 1.5 | 2.222 | 0.009 | 0.074 | 12.077 | 0.085 | 1.800 | 24.0 | 1.8 |
| C | 2 | 0.912 | 0.002 | 0.044 | 12.982 | 0.149 | 4.600 | 25.8 | 0.9 |
| D | 2.5 | 0.353 | 0.006 | 0.048 | 13.609 | 0.265 | 11.500 | 27.0 | 0.4 |
| E | 3 | 0.166 | 0.003 | 0.050 | 13.744 | 0.350 | 21.900 | 27.3 | 0.1 |
| F | 3.5 | 0.112 | 0.006 | 0.051 | 13.793 | 0.428 | 29.400 | 27.4 | 0.2 |
| G | 4 | 0.074 | 0.006 | 0.049 | 13.797 | 0.512 | 38.800 | 27.4 | 0.1 |
| H | 4.5 | 0.057 | 0.008 | 0.048 | 13.793 | 0.582 | 44.900 | 27.4 | 0.1 |
| I | 5 | 0.047 | 0.008 | 0.049 | 13.714 | 0.616 | 49.800 | 27.2 | 0.1 |
| J | 5.5 | 0.038 | 0.009 | 0.048 | 13.831 | 0.587 | 55.200 | 27.5 | 0.1 |

IA = 28.8 ± 0.3 Ma; J = 0.0011065 ± 0.0000051

PA = 27.2 ± 0.3 Ma (99% released gas)

IIA = 27.4 ± 0.3 Ma, n = 9, MSWD = 0.9

Sample DCA-28A

| | | | | | | | | | |
|---|-----|-------|-------|--------|--------|-------|--------|------|-----|
| A | 0.5 | 3.641 | 0.522 | -0.061 | 13.663 | 0.001 | 1.300 | 12.9 | 3.5 |
| B | 1 | 2.598 | 0.121 | 0.086 | 17.577 | 0.008 | 2.200 | 16.5 | 1.4 |
| C | 1.5 | 1.010 | 0.057 | 0.039 | 28.785 | 0.016 | 8.800 | 27.0 | 0.6 |
| D | 2 | 0.393 | 0.034 | 0.049 | 28.689 | 0.033 | 19.800 | 26.9 | 0.4 |
| E | 2.5 | 0.133 | 0.017 | 0.055 | 28.915 | 0.074 | 42.300 | 27.1 | 0.1 |
| F | 3 | 0.078 | 0.016 | 0.048 | 29.170 | 0.095 | 55.800 | 27.4 | 0.1 |
| G | 3.5 | 0.052 | 0.011 | 0.053 | 29.172 | 0.119 | 65.400 | 27.4 | 0.1 |

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| H | 4 | 0.057 | 0.014 | 0.050 | 29.191 | 0.129 | 63.300 | 27.4 | 0.1 |
| I | 4.5 | 0.053 | 0.013 | 0.051 | 29.069 | 0.194 | 64.900 | 27.3 | 0.1 |
| K | 5 | 0.036 | 0.009 | 0.052 | 29.134 | 0.187 | 73.400 | 27.3 | 0.1 |
| L | 5.2 | 0.027 | 0.008 | 0.050 | 29.022 | 0.183 | 78.300 | 27.2 | 0.1 |
| M | 5.5 | 0.038 | 0.010 | 0.050 | 29.143 | 0.201 | 72.300 | 27.3 | 0.1 |

IA = 27.2 ± 0.3 Ma; J = 0.0005227 ± 0.0000031

PA = 27.3 ± 0.3 Ma (99% released gas)

IIA = 27.35 ± 0.34 Ma, n = 10, MSWD = 0.5

Sample DCM-651C

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 1 | 8.245 | 0.005 | 0.095 | 27.541 | 0.056 | 1.100 | 50.3 | 9.1 |
| B | 2 | 1.822 | 0.005 | 0.052 | 11.573 | 0.100 | 2.100 | 21.3 | 1.1 |
| C | 2.5 | 0.568 | 0.003 | 0.042 | 8.454 | 0.155 | 4.800 | 15.6 | 0.4 |
| D | 3 | 0.265 | 0.001 | 0.049 | 8.541 | 0.210 | 9.800 | 15.7 | 0.3 |
| E | 3.5 | 0.173 | 0.001 | 0.047 | 8.621 | 0.242 | 14.400 | 15.9 | 0.3 |
| F | 4 | 0.148 | 0.001 | 0.045 | 8.919 | 0.256 | 16.900 | 16.4 | 0.2 |
| G | 4.5 | 0.160 | 0.000 | 0.048 | 8.960 | 0.276 | 15.900 | 16.5 | 0.2 |
| H | 5 | 0.157 | 0.001 | 0.047 | 8.832 | 0.371 | 16.000 | 16.3 | 0.1 |
| I | 5.2 | 0.155 | 0.002 | 0.047 | 8.760 | 0.386 | 16.100 | 16.1 | 0.1 |
| J | 5.4 | 0.118 | 0.001 | 0.046 | 8.943 | 0.384 | 20.400 | 16.5 | 0.1 |

IA = 17.2 ± 0.5 Ma; J = 0.0010238 ± 0.0000054

PA = 16.3 ± 0.3 Ma (94% released gas)

IIA = 16.66 ± 0.36 Ma, n = 8, MSWD = 1.1

Sample DCM-731C

| | | | | | | | | | |
|---|-----|-------|-------|-------|-------|-------|--------|------|-----|
| A | 1 | 1.666 | 0.223 | 0.063 | 9.656 | 0.016 | 1.900 | 21.1 | 3.2 |
| B | 2 | 0.380 | 0.211 | 0.055 | 9.593 | 0.043 | 7.900 | 21.0 | 0.7 |
| C | 3 | 0.147 | 1.073 | 0.040 | 8.877 | 0.086 | 17.000 | 19.4 | 0.5 |
| D | 4 | 0.080 | 0.486 | 0.043 | 8.510 | 0.127 | 26.500 | 18.6 | 0.2 |
| E | 5 | 0.095 | 0.663 | 0.047 | 8.619 | 0.178 | 23.500 | 18.9 | 0.2 |
| F | 5.5 | 0.084 | 0.231 | 0.042 | 8.572 | 0.199 | 25.700 | 18.8 | 0.3 |
| G | 6 | 0.084 | 0.202 | 0.045 | 8.443 | 0.085 | 25.300 | 18.5 | 0.6 |
| H | 6.5 | 0.221 | 1.179 | 0.085 | 8.617 | 0.001 | 11.700 | 18.9 | 6.2 |

IA = 19.0 ± 0.4 Ma; J = 0.0012168 ± 0.0000064

PA = 18.8 ± 0.3 Ma (92% released gas)

IIA = 18.1 ± 0.6 Ma, n = 7, MSWD = 1.3

Sample DCM-740A

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 0.5 | 3.949 | 0.014 | 0.184 | 15.643 | 0.067 | 1.300 | 33.2 | 4.5 |
| B | 1 | 5.088 | 0.007 | 0.136 | 2.425 | 0.027 | 0.200 | 5.2 | 5.6 |
| C | 1.5 | 2.707 | 0.008 | 0.088 | 8.521 | 0.034 | 1.100 | 18.2 | 4.3 |
| D | 2 | 0.884 | 0.013 | 0.054 | 6.606 | 0.039 | 2.500 | 14.1 | 1.0 |
| E | 2.5 | 0.507 | 0.012 | 0.048 | 7.131 | 0.088 | 4.500 | 15.2 | 0.7 |
| F | 3 | 0.255 | 0.011 | 0.048 | 6.934 | 0.118 | 8.400 | 14.8 | 0.3 |
| G | 3.5 | 0.205 | 0.011 | 0.044 | 7.258 | 0.134 | 10.700 | 15.5 | 0.3 |
| H | 4 | 0.225 | 0.014 | 0.046 | 7.361 | 0.168 | 10.000 | 15.7 | 0.3 |
| I | 4.5 | 0.117 | 0.015 | 0.043 | 7.160 | 0.210 | 17.100 | 15.3 | 0.1 |
| J | 5 | 0.169 | 0.014 | 0.049 | 7.051 | 0.230 | 12.400 | 15.1 | 0.3 |

IA = 16.2 ± 0.7 Ma; J = 0.0011854 ± 0.0000062

PA = 15.2 ± 0.4 Ma (94% released gas)

IIA = 15.43 ± 0.36 Ma, n = 9, MSWD = 1.3

Sample DCM-03A

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 0.5 | 0.958 | 0.023 | 0.041 | 6.311 | 0.028 | 2.200 | 12.4 | 1.3 |
| B | 1 | 0.377 | 0.030 | 0.045 | 15.852 | 0.075 | 12.500 | 31.1 | 0.9 |

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| C | 1.5 | 0.067 | 0.029 | 0.048 | 11.130 | 0.239 | 36.000 | 21.9 | 0.3 |
| D | 2 | 0.035 | 0.025 | 0.048 | 9.395 | 0.580 | 47.900 | 18.5 | 0.1 |
| E | 2.5 | 0.020 | 0.026 | 0.048 | 9.045 | 0.980 | 60.600 | 17.8 | 0.0 |
| F | 3 | 0.012 | 0.022 | 0.049 | 8.902 | 1.406 | 70.700 | 17.5 | 0.0 |
| G | 3.1 | 0.012 | 0.022 | 0.048 | 9.320 | 1.184 | 72.600 | 18.3 | 0.0 |
| H | 3.2 | 0.012 | 0.023 | 0.047 | 9.976 | 0.981 | 74.600 | 19.6 | 0.0 |

IA = 18.59 ± 0.19 Ma; J = 0.0010943 ± 0.0000053

IIA = 17.04 ± 0.18 Ma, n = 4, MSWD = 1.1

Sample DCM-731A

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 0.5 | 5.558 | 0.162 | 0.033 | 3.142 | 0.014 | 0.200 | 6.4 | 9.9 |
| B | 1 | 5.566 | 0.137 | 0.069 | 13.833 | 0.020 | 0.800 | 27.9 | 8.3 |
| C | 1.5 | 2.862 | 0.153 | 0.103 | 11.549 | 0.033 | 1.300 | 23.4 | 2.1 |
| D | 2 | 1.328 | 0.165 | 0.047 | 12.237 | 0.051 | 3.000 | 24.7 | 1.3 |
| E | 2.5 | 0.717 | 0.157 | 0.044 | 11.314 | 0.071 | 5.100 | 22.9 | 1.2 |
| F | 3 | 0.392 | 0.148 | 0.048 | 11.123 | 0.093 | 8.800 | 22.5 | 0.9 |
| G | 3.5 | 0.222 | 0.143 | 0.048 | 10.344 | 0.119 | 13.600 | 20.9 | 0.6 |
| H | 4 | 0.146 | 0.142 | 0.044 | 9.890 | 0.142 | 18.700 | 20.0 | 0.2 |
| I | 4.5 | 0.111 | 0.151 | 0.042 | 9.497 | 0.148 | 22.400 | 19.2 | 0.2 |
| J | 5 | 0.105 | 0.157 | 0.045 | 9.374 | 0.167 | 23.200 | 19.0 | 0.2 |

IA = 20.0 ± 0.7 Ma; J = 0.0011258 ± 0.0000059

IIA = 17.6 ± 0.6 Ma, n = 5, MSWD = 1.2

Sample DCA-27A

| | | | | | | | | | |
|---|-----|--------|-------|-------|---------|-------|--------|-------|------|
| A | 1 | 33.584 | 0.058 | 0.124 | 304.459 | 0.032 | 3.000 | 272.1 | 15.3 |
| B | 1.5 | 0.257 | 0.008 | 0.043 | 21.302 | 0.028 | 21.900 | 20.4 | 0.3 |
| C | 2 | 0.100 | 0.005 | 0.049 | 21.840 | 0.085 | 42.500 | 20.9 | 0.1 |
| D | 2.5 | 0.055 | 0.007 | 0.051 | 22.225 | 0.153 | 57.900 | 21.3 | 0.1 |
| E | 3 | 0.042 | 0.016 | 0.049 | 22.433 | 0.192 | 64.200 | 21.5 | 0.1 |
| F | 3.5 | 0.032 | 0.009 | 0.046 | 22.659 | 0.215 | 70.700 | 21.7 | 0.1 |
| G | 4 | 0.026 | 0.006 | 0.049 | 22.599 | 0.253 | 74.500 | 21.7 | 0.1 |
| H | 4.5 | 0.020 | 0.000 | 0.048 | 22.724 | 0.267 | 79.100 | 21.8 | 0.1 |
| I | 5 | 0.013 | 0.004 | 0.050 | 23.251 | 0.267 | 85.500 | 22.3 | 0.1 |
| J | 5.3 | 0.009 | 0.005 | 0.050 | 23.897 | 0.220 | 90.500 | 22.9 | 0.1 |
| K | 5.5 | 0.008 | 0.001 | 0.050 | 24.362 | 0.197 | 91.000 | 23.3 | 0.0 |

IA = 26.9 ± 0.6 Ma; J = 0.0005334 ± 0.0000032

Sample DCA-95

| | | | | | | | | | |
|---|-----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 1 | 2.418 | 0.015 | 0.049 | 13.771 | 0.033 | 1.900 | 30.0 | 8.4 |
| B | 2 | 0.392 | 0.001 | 0.042 | 6.164 | 0.110 | 5.100 | 13.5 | 1.2 |
| C | 2.5 | 0.102 | 0.000 | 0.043 | 9.842 | 0.171 | 24.500 | 21.5 | 0.4 |
| D | 3 | 0.035 | 0.000 | 0.045 | 10.697 | 0.246 | 51.000 | 23.3 | 0.2 |
| E | 3.5 | 0.016 | 0.000 | 0.045 | 11.568 | 0.304 | 71.600 | 25.2 | 0.1 |
| F | 4 | 0.008 | 0.003 | 0.045 | 12.487 | 0.385 | 84.200 | 27.2 | 0.1 |
| G | 4.5 | 0.005 | 0.004 | 0.044 | 13.218 | 0.470 | 90.300 | 28.8 | 0.1 |
| H | 5 | 0.004 | 0.003 | 0.043 | 13.274 | 0.519 | 92.500 | 28.9 | 0.1 |
| I | 5.5 | 0.003 | 0.004 | 0.043 | 14.090 | 0.537 | 94.000 | 30.7 | 0.0 |
| J | 6 | 0.009 | 0.003 | 0.043 | 16.212 | 0.148 | 86.200 | 35.3 | 0.1 |

IA = 27.5 ± 0.4 Ma; J = 0.0012145 ± 0.0000063

Mn-oxide samples

Sample DCM-442

| | | | | | | | | | |
|---|---|-------|-------|-------|--------|-------|--------|------|-----|
| A | 2 | 0.145 | 0.073 | 0.045 | 9.991 | 0.081 | 19.000 | 10.0 | 0.1 |
| B | 4 | 0.022 | 0.050 | 0.046 | 11.932 | 0.199 | 65.000 | 11.9 | 0.0 |
| C | 6 | 0.011 | 0.048 | 0.049 | 12.150 | 0.473 | 79.000 | 12.1 | 0.0 |

| | | | | | | | | | |
|---|----|-------|-------|-------|--------|-------|--------|------|-----|
| D | 8 | 0.010 | 0.037 | 0.045 | 12.197 | 0.419 | 79.800 | 12.2 | 0.0 |
| E | 10 | 0.006 | 0.028 | 0.045 | 12.207 | 0.114 | 86.700 | 12.2 | 0.0 |

IA = 11.99 ± 0.15 Ma; J = 0.0005544 ± 0.0000033

PA = 12.16 ± 0.15 Ma (78% released gas)

IIA = 12.28 ± 0.28 Ma, n = 3, MSWD = 1.2

Sample DCM-577

| | | | | | | | | | |
|---|----|-------|-------|-------|--------|-------|-------|------|-----|
| A | 1 | 3.040 | 0.433 | 0.075 | 9.507 | 0.009 | 1.000 | 9.0 | 1.3 |
| B | 2 | 1.605 | 0.399 | 0.070 | 11.682 | 0.017 | 2.400 | 11.0 | 0.8 |
| C | 4 | 1.882 | 1.661 | 0.101 | 9.246 | 0.007 | 1.600 | 8.7 | 3.2 |
| D | 10 | 1.090 | 3.475 | 0.171 | 9.318 | 0.003 | 2.800 | 8.8 | 1.5 |

IA = 9.9 ± 1.6 Ma; J = 0.000524 ± 0.0000031

PA = 10.1 ± 1.7 Ma (100% released gas)

IIA = 11.3 ± 3.4 Ma, n = 4, MSWD = 1.3

Sample DCM-440

| | | | | | | | | | |
|---|----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 2 | 0.587 | 0.021 | 0.051 | 3.000 | 0.018 | 1.700 | 3.1 | 1.8 |
| B | 4 | 0.284 | 0.008 | 0.045 | 6.486 | 0.038 | 7.200 | 6.7 | 0.2 |
| C | 6 | 0.108 | 0.005 | 0.046 | 10.282 | 0.049 | 24.300 | 10.6 | 0.1 |
| D | 8 | 0.011 | 0.003 | 0.045 | 10.352 | 0.098 | 76.500 | 10.6 | 0.0 |
| E | 10 | 0.003 | 0.003 | 0.047 | 10.355 | 0.280 | 92.400 | 10.7 | 0.0 |
| F | 13 | 0.002 | 0.003 | 0.043 | 10.383 | 0.639 | 95.800 | 10.7 | 0.0 |
| G | 16 | 0.001 | 0.002 | 0.043 | 10.325 | 0.341 | 96.400 | 10.6 | 0.0 |
| H | 19 | 0.001 | 0.005 | 0.043 | 10.013 | 0.059 | 96.400 | 10.3 | 0.0 |

IA = 10.45 ± 0.13 Ma; J = 0.0005705 ± 0.0000034

PA = 10.65 ± 0.13 Ma (93% released gas)

IIA = 10.66 ± 0.12 Ma, n = 5, MSWD = 1.6

Sample DCA-10B

| | | | | | | | | | |
|---|----|--------|--------|--------|--------|-------|-------|------|------|
| A | 1 | 56.257 | -1.016 | -0.362 | 7.055 | 0.001 | 0.000 | 7.2 | 38.1 |
| B | 2 | 5.264 | -0.056 | 0.093 | 10.770 | 0.007 | 0.700 | 11.0 | 2.4 |
| C | 4 | 1.877 | 0.226 | 0.043 | 9.148 | 0.032 | 1.600 | 9.4 | 0.7 |
| D | 10 | 1.022 | 0.122 | 0.071 | 9.651 | 0.076 | 3.100 | 9.9 | 0.4 |
| E | 20 | 2.862 | 0.780 | 0.240 | 9.409 | 0.014 | 1.100 | 9.7 | 2.0 |

IA = 9.8 ± 0.8 Ma; J = 0.0005688 ± 0.0000034

PA = 9.8 ± 0.8 Ma (100% released gas)

IIA = 9.8 ± 1.4 Ma, n = 5, MSWD = 0.22

Sample DCA-02

| | | | | | | | | | |
|---|----|-------|-------|-------|-------|-------|--------|------|-----|
| A | 1 | 0.704 | 0.397 | 0.047 | 5.264 | 0.010 | 2.500 | 10.2 | 1.1 |
| B | 3 | 0.211 | 0.369 | 0.049 | 7.240 | 0.049 | 10.400 | 14.0 | 0.4 |
| C | 5 | 0.015 | 0.196 | 0.042 | 7.399 | 0.074 | 62.200 | 14.3 | 0.1 |
| D | 8 | 0.002 | 0.101 | 0.045 | 7.207 | 0.317 | 91.500 | 13.9 | 0.0 |
| E | 10 | 0.001 | 0.077 | 0.042 | 7.209 | 0.643 | 96.200 | 14.0 | 0.0 |
| F | 15 | 0.001 | 0.084 | 0.043 | 7.235 | 0.196 | 94.800 | 14.0 | 0.0 |

IA = 14.0 ± 0.3 Ma; J = 0.0010744 ± 0.0000124

PA = 14.0 ± 0.3 Ma (90% released gas)

IIA = 13.92 ± 0.32 Ma, n = 4, MSWD = 1.7

Sample DCA-71

| | | | | | | | | | |
|---|-----|-------|--------|-------|---------|-------|--------|--------|--------|
| A | 1.1 | 2.563 | 10.230 | 1.536 | 207.477 | 0.000 | 21.400 | 372.60 | 177.13 |
| B | 2 | 2.972 | 1.111 | 2.048 | 25.813 | 0.000 | 2.900 | 50.76 | 16.16 |
| C | 4 | 1.437 | 3.392 | 1.530 | 17.121 | 0.001 | 3.900 | 33.83 | 12.13 |
| D | 6 | 1.157 | 3.324 | 0.941 | 12.515 | 0.001 | 3.500 | 24.79 | 7.02 |
| E | 10 | 0.671 | 3.202 | 0.394 | 12.799 | 0.003 | 6.100 | 25.35 | 2.67 |

| | | | | | | | | | |
|---|----|-------|-------|-------|--------|-------|-------|-------|-------|
| F | 14 | 0.362 | 4.490 | 0.216 | 9.665 | 0.009 | 8.300 | 19.17 | 1.14 |
| G | 20 | 0.534 | 6.008 | 0.148 | 12.295 | 0.001 | 7.200 | 24.35 | 10.57 |

IA= 23.9 ± 1.5 Ma; J = 0.0011028 ± 0.0000058

PA = 20.5 ± 1.9 Ma (100% released gas)

IIA = 15 ± 4 Ma, n = 6, MSWD = 0.27

Sample DCA-10A

| | | | | | | | | | |
|---|------|-------|--------|-------|---------|-------|--------|-------|--------|
| A | 3 | 1.457 | 1.850 | 0.080 | 9.341 | 0.004 | 2.100 | 9.3 | 1.5 |
| B | 6 | 1.535 | 5.595 | 0.115 | 4.583 | 0.001 | 1.000 | 4.6 | 5.8 |
| C | 10 | 1.165 | 3.233 | 0.173 | 6.988 | 0.002 | 2.000 | 7.0 | 5.5 |
| D | 12 | 1.757 | 3.648 | 0.436 | 8.940 | 0.000 | 1.700 | 8.9 | 37.1 |
| E | 18.9 | 5.529 | 78.275 | 3.565 | 739.714 | 0.000 | 30.500 | 621.4 | 1256.2 |

IA = 9 ± 5 Ma; J = 0.0005544 ± 0.0000033

PA = 9 ± 3 Ma (100% released gas)

Sample DCA-01

| | | | | | | | | | |
|---|----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 1 | 0.299 | 0.081 | 0.051 | 4.309 | 0.075 | 4.700 | 7.8 | 0.3 |
| B | 2 | 0.156 | 0.092 | 0.048 | 4.747 | 0.107 | 9.300 | 8.6 | 0.2 |
| C | 3 | 0.091 | 0.085 | 0.045 | 5.281 | 0.087 | 16.400 | 9.6 | 0.2 |
| D | 3 | 0.059 | 0.085 | 0.045 | 7.031 | 0.122 | 28.600 | 12.8 | 0.1 |
| E | 4 | 0.029 | 0.085 | 0.046 | 9.886 | 0.156 | 53.800 | 17.9 | 0.1 |
| F | 6 | 0.009 | 0.068 | 0.046 | 13.461 | 0.315 | 83.900 | 24.4 | 0.0 |
| G | 8 | 0.002 | 0.061 | 0.044 | 13.358 | 0.860 | 95.800 | 24.2 | 0.0 |
| H | 11 | 0.001 | 0.070 | 0.045 | 9.966 | 2.318 | 97.700 | 18.1 | 0.0 |
| I | 16 | 0.001 | 0.073 | 0.045 | 8.632 | 4.997 | 98.300 | 15.7 | 0.0 |
| J | 18 | 0.001 | 0.052 | 0.044 | 14.546 | 0.533 | 97.800 | 26.3 | 0.0 |
| K | 25 | 0.001 | 0.031 | 0.045 | 21.859 | 0.085 | 99.000 | 39.4 | 0.2 |

IA = 17.8 ± 0.4 Ma; J = 0.0010446 ± 0.000012

Sample DCA-08

| | | | | | | | | | |
|---|----|-------|-------|-------|-------|-------|--------|-----|-----|
| A | 1 | 0.607 | 0.005 | 0.038 | 1.747 | 0.015 | 1.000 | 3.3 | 1.7 |
| B | 2 | 0.268 | 0.021 | 0.043 | 3.781 | 0.038 | 4.500 | 7.1 | 0.5 |
| C | 4 | 0.019 | 0.018 | 0.045 | 3.414 | 0.069 | 38.300 | 6.4 | 0.1 |
| D | 6 | 0.003 | 0.015 | 0.044 | 2.321 | 0.090 | 70.100 | 4.4 | 0.0 |
| E | 8 | 0.001 | 0.021 | 0.045 | 2.517 | 0.455 | 90.700 | 4.7 | 0.0 |
| F | 10 | 0.001 | 0.016 | 0.044 | 3.281 | 1.240 | 95.200 | 6.2 | 0.0 |
| G | 15 | 0.001 | 0.016 | 0.046 | 3.983 | 1.227 | 95.100 | 7.5 | 0.0 |
| H | 20 | 0.057 | 0.248 | 0.046 | 0.126 | 0.003 | 0.700 | 0.2 | 1.8 |

IA = 6.44 ± 0.15 Ma; J = 0.0010075 ± 0.0000116

Sample DCM-447

| | | | | | | | | | |
|---|----|-------|-------|-------|--------|-------|--------|------|-----|
| A | 1 | 0.025 | 0.083 | 0.043 | 7.946 | 0.030 | 51.600 | 15.4 | 0.2 |
| B | 3 | 0.030 | 0.088 | 0.045 | 8.033 | 0.117 | 47.700 | 15.6 | 0.1 |
| C | 5 | 0.001 | 0.098 | 0.044 | 7.258 | 0.281 | 95.200 | 14.1 | 0.0 |
| D | 8 | 0.001 | 0.077 | 0.045 | 9.779 | 0.791 | 97.600 | 18.9 | 0.0 |
| E | 9 | 0.001 | 0.047 | 0.045 | 10.177 | 0.948 | 98.500 | 19.7 | 0.0 |
| F | 10 | 0.001 | 0.057 | 0.045 | 9.215 | 0.174 | 98.200 | 17.9 | 0.0 |
| G | 15 | 0.000 | 0.074 | 0.043 | 7.391 | 0.029 | 99.300 | 14.3 | 0.2 |

IA = 18.3 ± 0.4 Ma; J = 0.0010768 ± 0.0000124