

## **SUPPLEMENTARY INFORMATION**

### **Quantifying hydrofluoric acid etching of quartz and feldspar coarse grains based on weight loss estimates: implication for ESR and luminescence dating studies**

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| Sample     | MS1_100-150       |            | MS-2_100-150      |            | MS-3_100-150      |            | MF5_100-150       |            | MS1_150-200       |            | MS2_150-200       |            | MS3_150-200       |            | MF5_150-200       |            |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|
| Time (min) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) |
| 10         | 3.68              | 0.68       | 2.30              | 0.39       | 4.38              | 3.02       | 60.13             | 11.45      | 3.87              | 0.67       | 2.37              | 0.39       | 6.42              | 1.27       | 40.28             | 6.82       |
| 20         | 5.10              | 0.94       | 5.26              | 0.90       | 5.29              | 3.64       | 55.63             | 10.60      | 5.04              | 0.87       | 3.64              | 0.60       | 9.66              | 1.91       | 35.44             | 6.00       |
| 40         | 10.55             | 1.94       | 7.92              | 1.35       | 8.55              | 5.88       | -                 | -          | 8.09              | 1.40       | 7.29              | 1.20       | 16.02             | 3.16       | 85.84             | 14.53      |
| 60         | 13.40             | 2.46       | 10.93             | 1.86       | 11.80             | 8.12       | -                 | -          | 13.19             | 2.28       | 10.67             | 1.75       | 17.68             | 3.49       | 90.36             | 15.29      |

Table S1. Numerical data (removed thickness and associated error) derived from Experiment #1 with HF (40%). These data are graphically displayed in Figure 2.

| Sample     | MS1_100-150       |            | MS-2_100-150      |            | MS-3_100-150      |            | MF5_100-150       |            | MS1_150-200       |            | MS2_150-200       |            | MS3_150-200       |            | MF5_150-200       |            |
|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|
| Time (min) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) | Remo. Thick. (μm) | Error (μm) |
| 10         | 1.42              | 0.26       | 0.38              | 0.06       | 1.45              | 1.00       | 7.98              | 1.52       | 0.32              | 0.06       | 0.24              | 0.04       | 2.01              | 0.40       | 7.24              | 1.23       |
| 20         | 1.57              | 0.29       | 0.67              | 0.11       | 1.75              | 1.21       | 9.13              | 1.74       | 0.73              | 0.13       | 0.25              | 0.04       | 3.01              | 0.59       | 8.36              | 1.41       |
| 40         | 2.33              | 0.43       | 0.95              | 0.16       | 2.38              | 1.64       | 12.12             | 2.31       | 0.98              | 0.17       | 0.94              | 0.15       | 2.56              | 0.51       | 12.33             | 2.09       |
| 60         | 2.58              | 0.47       | 1.21              | 0.21       | 2.99              | 2.06       | 15.43             | 2.94       | 1.96              | 0.34       | 1.06              | 0.17       | 4.13              | 0.82       | 13.97             | 2.36       |

Table S2. Numerical data (removed thickness and associated error) derived from Experiment #1 with HF (10%). These data are graphically displayed in Figure 2.

| Sample     | MS1_50-100             |            | MS1_100-150            |            | MS1_150-200            |            | MS-1_200-250           |            | MS-1_250-300           |            | MS-3_150-200           |            |
|------------|------------------------|------------|------------------------|------------|------------------------|------------|------------------------|------------|------------------------|------------|------------------------|------------|
| Time (min) | Removed thickness (μm) | Error (μm) | Removed thickness (μm) | Error (μm) | Removed thickness (μm) | Error (μm) | Removed thickness (μm) | Error (μm) | Removed thickness (μm) | Error (μm) | Removed thickness (μm) | Error (μm) |
| 10         | 5.29                   | 1.15       | 4.13                   | 0.76       | 3.85                   | 0.67       | 3.01                   | 0.48       | 3.01                   | 0.42       | 7.04                   | 1.39       |
| 20         | 8.10                   | 1.77       | 7.91                   | 1.45       | 7.33                   | 1.27       | 5.84                   | 0.92       | 6.21                   | 0.88       | 12.50                  | 2.47       |
| 40         | 15.14                  | 3.30       | 17.08                  | 3.14       | 16.83                  | 2.91       | 13.90                  | 2.19       | 15.32                  | 2.16       | 26.46                  | 5.23       |
| 60         | 21.79                  | 4.75       | 27.57                  | 5.07       | 26.26                  | 4.54       | 24.86                  | 3.92       | 27.78                  | 3.92       | 41.51                  | 8.20       |

Table S3. Numerical data (removed thickness and associated error) derived from Experiment #2. These data are graphically displayed in Figure 2.

| Sample  | Removed thickness (μm) | Error (μm) |
|---------|------------------------|------------|
| DY08-9  | 11.07                  | 1.59       |
| DY08-10 | 11.63                  | 1.68       |
| DY08-11 | 13.38                  | 1.82       |
| DY08-12 | 12.81                  | 1.87       |
| DY08-13 | 12.35                  | 1.56       |
| DY08-14 | 18.59                  | 2.44       |
| DY08-15 | 12.10                  | 1.64       |
| DY08-16 | 14.56                  | 1.91       |
| DY08-17 | 12.51                  | 1.74       |
| DY08-18 | 12.20                  | 1.72       |
| DY08-19 | 12.71                  | 1.72       |
| DY08-20 | 11.77                  | 1.64       |
| DY08-21 | 12.70                  | 1.83       |
| DY08-22 | 11.99                  | 2.09       |

*Table S4. Numerical data (removed thickness and associated error) derived from Experiment #3. These data are graphically displayed in Figure 3.*