Supplementary Figure 1. Microscopy of the titanium particulates where EDS was conducted (a) and the EDS spectrum of the area (b). EDS shows the elements of the sonicator horn (titanium, vanadium, and aluminum) along with the iridium used to coat the particles. Carbon and oxygen are also shown and are likely from the carbon tape and the atmosphere. No silicon is present which indicates that it was not leached from solution.

Supplementary Table 1: Expected Composition for Lithium Disilicate Glass and ICP Results from Spectrochemical Laboratories

| Material | Expected Composition (wt. %) | Spectrochemical Laboratories Analysis (wt. %) |
|----------|------------------------------|-------------------------------------------|
| Li₂O     | 19.91                        | 17.88                                     |
| SiO₂     | 80.09                        | 81.03                                     |
### Supplementary Table 2: Surface Area Measurements for Type 1/Normal Leaching Surfaces

| Type 1 Surfaces | SA/PA ratio | Mean Ratio | Mean Percent SA Increase |
|----------------|-------------|------------|--------------------------|
| Projection 1   | 1.003       | 1.003      | 0.3%                     |
| Projection 2   | 1.002       |            |                          |

### Supplementary Table 3: Surface Area Measurements for Type 2 Surfaces

| Dissolution Conditions | SA/PA ratio | Percent SA Increase |
|------------------------|-------------|---------------------|
| 7.5 hr., 10 W cm\(^{-2}\) Reconstructions |             |                     |
| Projection 1            | 1.061       | 6.1%                |
| Projection 2            | 1.034       | 3.4%                |
| Mean                    | 1.048       | 4.8%                |
| 1 hr., 20 W cm\(^{-2}\) Reconstructions |             |                     |
| Projection 1            | 1.024       | 2.4%                |
| Projection 2            | 1.036       | 3.6%                |
| Projection 3            | 1.023       | 2.3%                |
| Mean                    | 1.028       | 2.8%                |
| 7.5 hr., 20 W cm\(^{-2}\) Reconstructions |             |                     |
| Projection 1            | 1.058       | 5.8%                |

### Supplementary Table 4: Surface Area Measurements for Type 3 Surfaces

| Dissolution conditions | SA/PA Ratio | Percent SA Increase |
|------------------------|-------------|---------------------|
| 1 hr., 10 W cm\(^{-2}\) Reconstructions |             |                     |
| Projection 1            | 1.308       | 30.8%               |
| Projection 2            | 1.333       | 33.3%               |
| Projection 3            | 1.406       | 40.6%               |
| Mean                    | 1.349       | 34.9%               |
| 7.5 hr., 10 W cm\(^{-2}\) Reconstructions |             |                     |
| Projection 1            | 1.109       | 10.9%               |
| Projection 2            | 1.120       | 12.0%               |
| Projection 3            | 1.152       | 15.2%               |
| Mean                    | 1.127       | 12.7%               |
| 1 hr., 20 W cm\(^{-2}\) Reconstructions |             |                     |
| Projection 1            | 1.317       | 31.7%               |
| Projection 2            | 1.342       | 34.2%               |
| Projection 3            | 1.202       | 20.2%               |
| Mean                    | 1.287       | 28.7%               |
| 7.5 hr., 20 W cm\(^{-2}\) Reconstructions |             |                     |
| Projection 1            | 1.287       | 28.7%               |