Supporting Information

Retention in porous layer pillar array planar separation platforms

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Determination by simple modeling of surface area increase due to PSO deposition

Each pillar was assumed to be a cylinder with a height of 20 um and a radius of 1 um. The PSO coating was then assumed to be a close-packed arrangement of spheres around this cylinder, adding 0.05, 0.1, or 0.15 um to the cylinder radius depending on the thickness of PSO deposited. Figure S-1 illustrates this model.

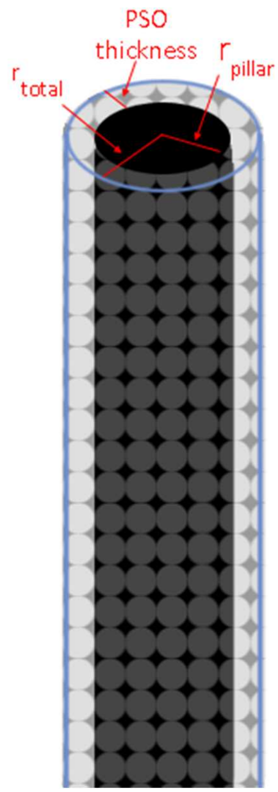

Figure S-1: Depiction of the model used to calculate surface area increase.

The volume of PSO, V_{PSO}, was calculated by subtracting the volume of the smaller cylinder, without PSO, from that of the larger cylinder. The volume of PSO that is not void, V_{porous}, was then calculated using the 34% void fraction determined by ellipsometry

$$V_{porous} = V_{PSO} * (1 - void\ fraction). \qquad (1)$$

The volume of one sphere, $V_{1sphere}$, was calculated by assuming that one PSO granule has a radius of 0.0025 um. This allowed us to calculate the number of spheres present, $N_{spheres}$, using

$$N_{spheres} = \frac{V_{porous}}{V_{1sphere}}. \qquad (2)$$

The surface area of all the spheres, A_{porous}, could then be calculated by

$$A_{porous} = A_{1sphere} * N_{spheres} * Rg, \qquad (3)$$

where $A_{1sphere}$ is the surface area of one sphere, assuming a radius of 0.0025 um, and Rg is a surface roughness factor assumed to be 3. This value could then be compared to the surface area of the small pillar, A_{pillar}, by computing a ratio

$$increased\ area = \frac{A_{porous}+A_{pillar}}{A_{pillar}}. \qquad (4)$$