

## Design and fabrication of a poly dimethyl siloxane device for evaluating the effect of pillar geometry and configuration in the flow separation using deterministic lateral displacement

### Material Support Document (S1)

10 different configurations are used to study the effect of the shape of the pillars, the row shift angles, and the orientation of the triangular micropillars executing the deterministic lateral displacement. The different configurations are shown in Figure S1.

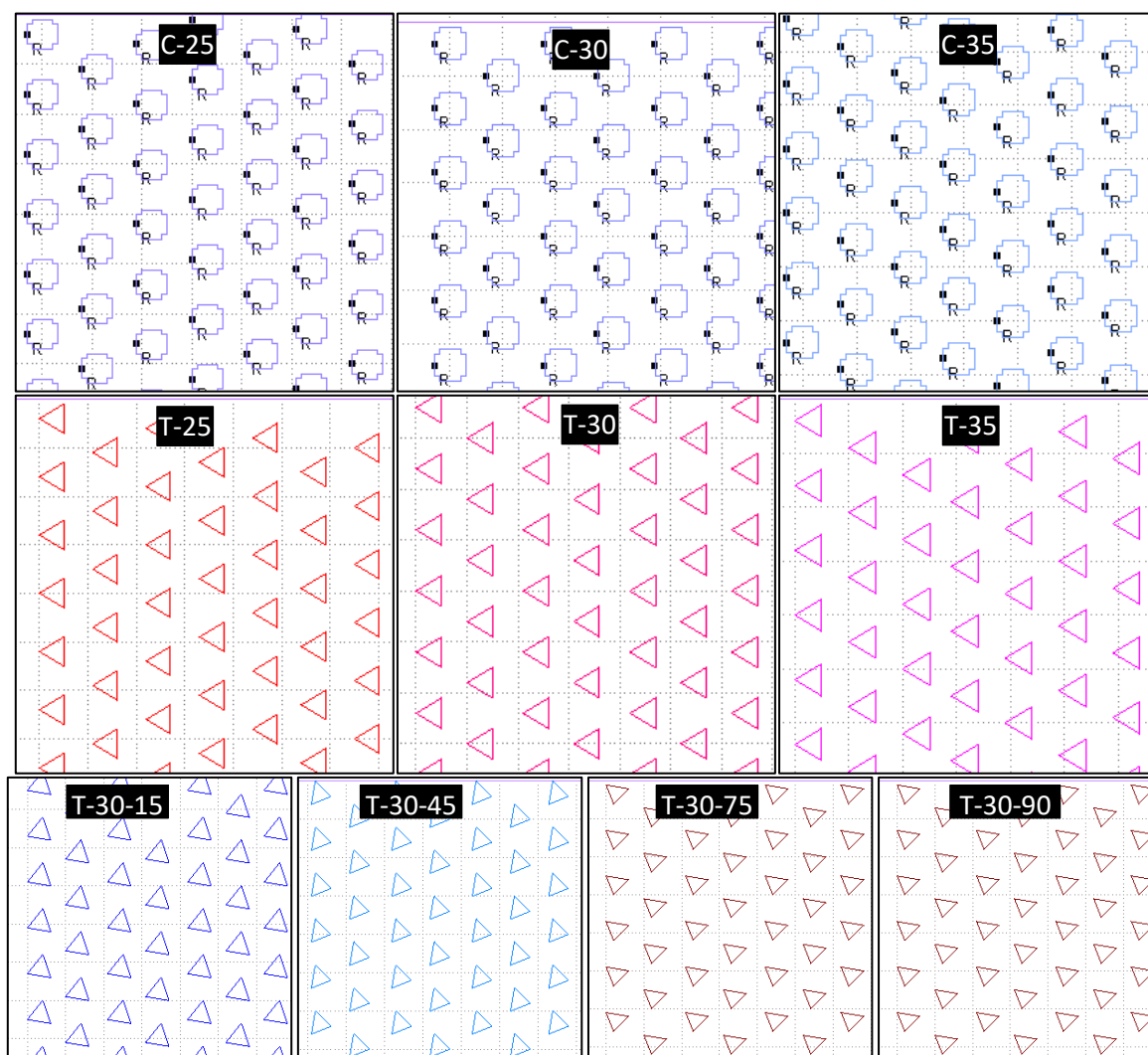


Figure S1. Configuration 1, 2, 3: Circular posts with a tilt angle of 25°, 30°, 35°. Configuration 4, 5, 6: Triangular posts with a row shift angle of 25°, 30°, 35°. Configuration 7, 8, 9, 10: Triangular posts with a row shift angle of 30° and a rotation angle of 15°, 45°, 75° and 90°.

The microscopic images of the silicon masters after photolithography and deep reactive ion etching showing the device consisting of triangular pillars with a row shift angle of 30° and an orientation of 90° is shown in Figure S2.



Figure S2. Microscopic image of the device, a) 5x, b) 20x, and c) 50x.

The results of the particle tracing module incorporated to know the path taken by the particles at the end of 0.1 S are shown in Figure S3.

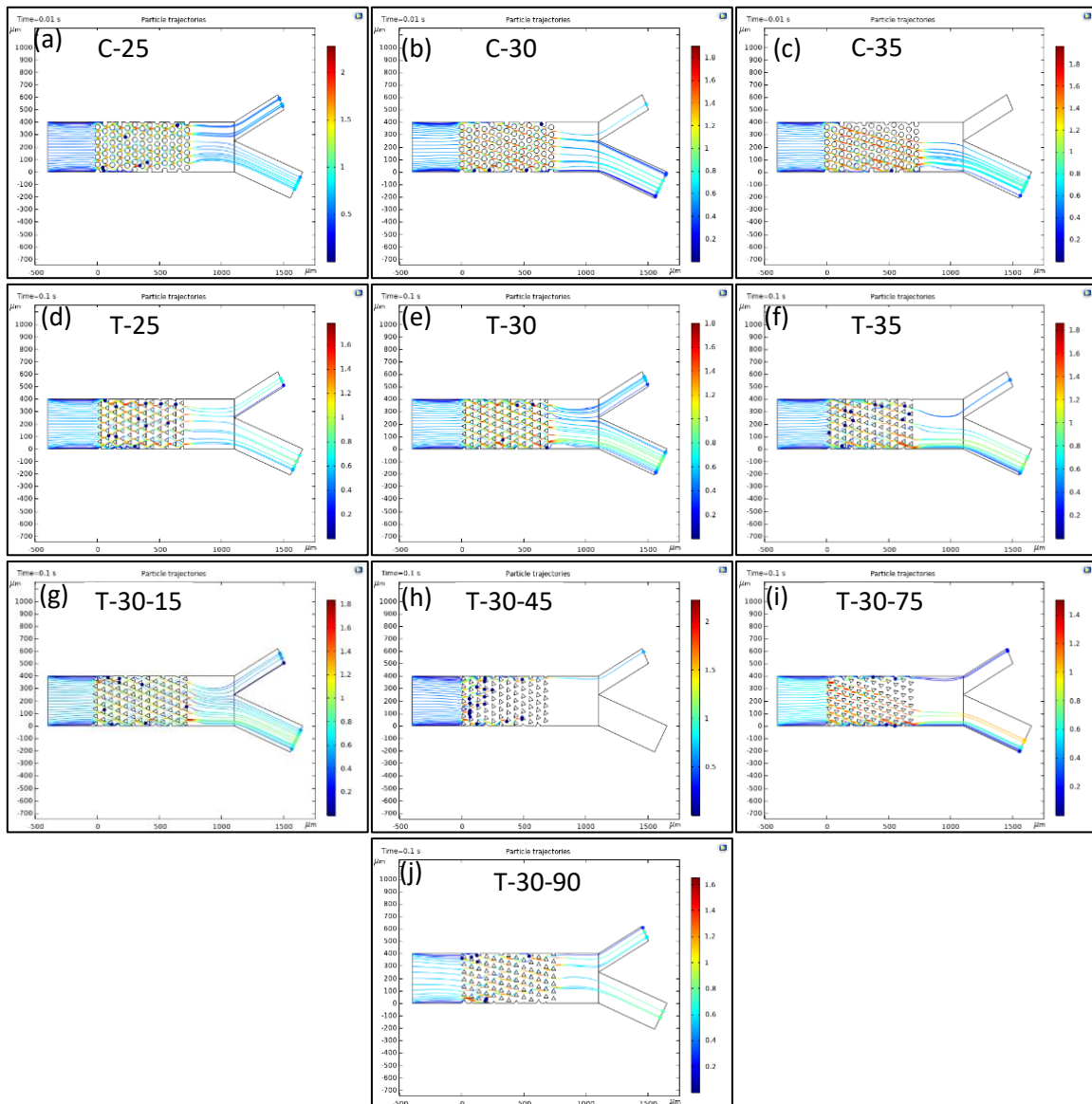


Figure S3. Particle tracing simulations and the number of particles reaching outlet 1 and outlet 2.

The experimental setup used to determine the bond strength in the devices is shown in Figure S4. Figure S4 (a) shows the initial configuration of the setup with the strips placed in the jaws. Tensile force is applied to the assembly, and thus, step 2, i.e., Figure S4(b), shows the peeling test under progress.

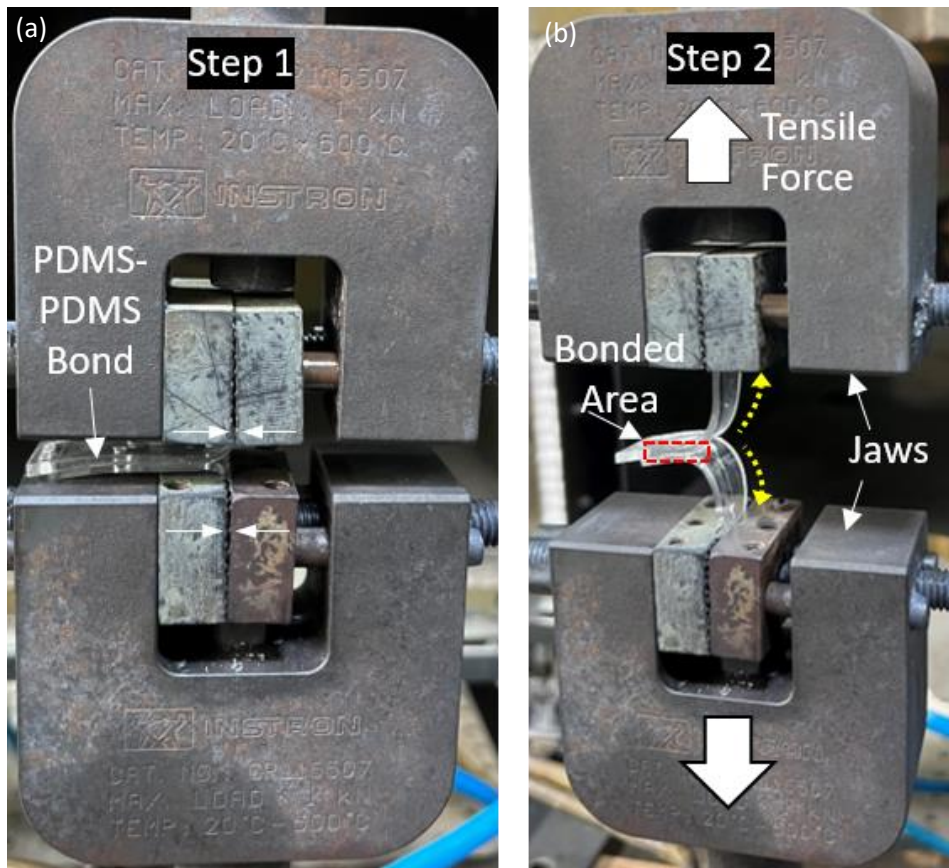


Figure S4. (a) Initial configuration of the 180° T-peel test, (b) Final configuration of the peel test where the delamination is observed.

The boundary conditions used for the numerical simulations are shown in Figure S5. Figure S5(a) and (b) show the triangular pillars with sharp and rounded vertices. The device is divided into 3 domains, mainly domain 1, which consists of the inlet and the DLD pillar section; domain 2 is associated with outlet 1, and domain 3 is associated with outlet 2.

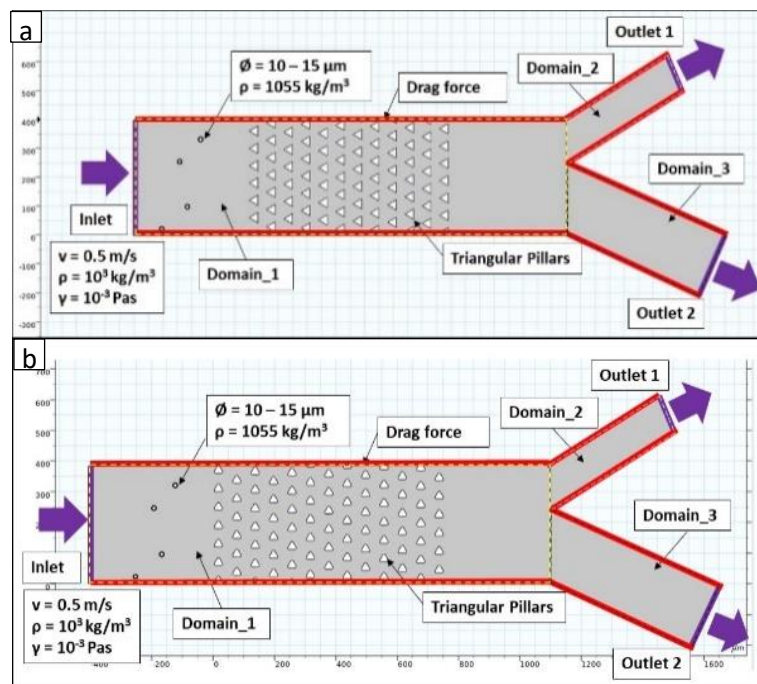


Figure S5. Boundary conditions with (a) pointed and (b) rounded vertices.