



A 3D schematic diagram of a microfluidic device. It features a large, semi-transparent grey sphere resting on a porous, blue, fibrous layer. This layer is situated on a purple substrate. Several yellow, rectangular components are visible on the purple substrate, likely representing electrodes or fluidic ports. A white rectangular box highlights a specific region on the porous layer, with lines extending from it to a larger, detailed view shown in the adjacent figure.

Superhydrophobic NWs

Gate Dielectrics

Gate (G)

The diagram illustrates the contact angle of a droplet on a substrate with a thin liquid layer. It is divided into two parts: advancing contact angle (θ_{adv}^*) and receding contact angle (θ_{rec}^*).

Advancing Contact Angle (θ_{adv}^*): A droplet of radius R is shown on a substrate with a thin liquid layer of thickness Δl . The droplet is in contact with the substrate at a contact angle θ_{adv}^* . The height of the droplet is ΔH . The distance from the contact line to the center of the droplet is Δx . A blue arrow labeled σ indicates the surface tension force.

Receding Contact Angle (θ_{rec}^*): A droplet of radius R is shown on a substrate with a thin liquid layer of thickness Δl . The droplet is in contact with the substrate at a contact angle θ_{rec}^* . The height of the droplet is ΔH . The distance from the contact line to the center of the droplet is Δx .

Inset: A magnified view of the thin liquid layer shows the surface profile with a wavelength $2r$ and a height Δl .

 σ ΔH θ^*
adv

R

$$\Delta x$$
 $2r$ ΔI θ_{rec}^* ΔH Δx Δ