



Surface Modification of Microfluidic Devices

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Controlling surface wettability is important for microfluidic devices. Parylene is a commonly used dielectric coating on lab-on-a-chip devices, but current methods for chemically modifying parylene can leave the surface jagged and uneven. Our approach to modifying the wettability uses phenyl azides containing either a hydrophilic tail consisting of a pegylated (PEGA) or a hydrophobic tail consisting of a perfluorinated (PFA) phenyl azide. The surfaces are coated with the phenyl azide and irradiated with UV light behind pyrex glass (to avoid ozone exposure). Irradiation excites the azide to form a nitrene which then inserts into a carbon-hydrogen bond at the parylene surface. Unmodified parylene surfaces exhibit a water droplet contact angle of 80-100°. Our studies show a contact angle change of -20° for surfaces coated with PEGA (60-65°) after irradiation. Additionally, we have been able to pattern PEGA on parylene surfaces. The PFA modified surfaces exhibit no change in contact angle. The covalent modification of parylene with PEGA provides a convenient way to control the surface hydrophilicity and thus patterning can be achieved by using masks.

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