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Fabrication techniques for bioinspired, mechanically-durable, superliquiphobic surfaces for water, oil, and surfactant repellency

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Abstract

Nature provides inspiration for liquid-repellant and low-adhesive surfaces, such as the lotus leaf and pitcher plant. While water-repellency is frequently found in nature, oil-repellency and surfactant-repellency are uncommon to nonexistent. To obtain oil- and surfactant-repellency, hierarchical, re-entrant, bioinspired surface structures along with low surface energy materials are needed. This overview presents wetting literature, common liquids and their composition, and fabrication techniques for superliquiphobic surfaces with repellency toward water, oil, and surfactant-containing liquids. Four techniques for creating such surfaces are explained in detail: nanoparticle/binder, layer-by-layer, nanoparticle-encapsulation, and liquid-impregnation. Static contact and tilt

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