

Universal liquid infused bilayer dual component electrospun nanofiber membrane for multiple phase liquid separation

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Materials with selective interfacial activity dominates the industrial and environmental liquid separation application. Existing liquid separation techniques are primarily influenced by chemical and physical modification to tune the membranes' surface energy. Herein we demonstrate a new breed of separating material, influenced by the concept of using liquid to oppose immiscible contacting liquid, a liquid infused textured electrospun nanofiber membrane (TNM) was scrutinized. A uniform over layer interface was established to repel other immiscible liquids. The TNM was fabricated by electrospinning followed by in-situ hydrothermal reaction to promote texture onto the nanofiber surface. The generated nanostructure was then transformed to an amphiphilic membrane through chemical functionalization. The property of the infused liquid was used to regulate the membrane's interface wettability which is a viable characteristic for multiphase liquid separation. Furthermore, the infusing liquid can be switched by other liquids depending on the separation requirement, this sophisticated property makes the TNM versatile and universally adaptable on any operational requirement.