

## PVDF 及び PVA・PAA ナノファイバーを用いた液-液分離

### Electrospun PVDF and PVA・PAA Nanofibers for Efficient Liquid-Liquid Separation

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Water pollution has aroused worldwide attention with the fast development of mining, petroleum and chemical industries over decades.<sup>[1]</sup> Recently, the unlimited discharge of household wastewater is becoming another burden to water environment.<sup>[2]</sup> The household wastewater is commonly composed of water, cooking oils and detergents. Therefore, the effective separation of cooking oils from household wastewater will be beneficial to environmental benignity. To this end, several methods, e.g., fabrics<sup>[3]</sup>, oil skimming and mechanical collection<sup>[4]</sup> (to be confirmed)<sup>[5]</sup>, have been proposed. Among them, membrane separation is an emerging and promising technology due to high efficiency and relatively facile operational process. Here, hydrophilic PVA・PAA nanofiber membrane (Fig. 1a) and oleophilic PVDF nanofiber membrane (Fig. 1b) were fabricated by electrospinning. The pair of PVA・PAA membrane and PVDF membrane could successfully separate oils and water, e.g., silicon oil vs. water and oleic acid vs. water. Afterwards, PVDF membrane was modified by DTMS coating. As a result, the pair of PVDF membrane and DTMS-coated PVDF membrane (Fig. 1c) could separate oils, e.g., silicon oil vs. oleic acid. Finally, a two-step separation was established by using two T-tubes (Fig. 2a). The first T-tube aimed at separating oils and water. And the second one was designed to separate oils. Consequently, 3 types of liquids, i.e., water, silicon oil and oleic acid, were feasibly and effectively separated by this equipment with high efficiencies (Fig. 2b). The study provides a general strategy to separate several kinds of liquids in one equipment.

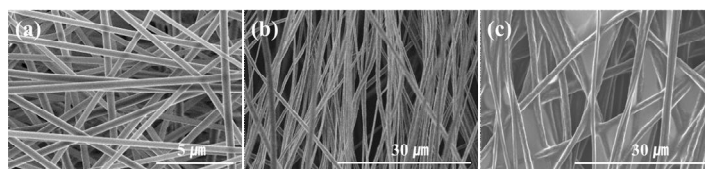


Fig. 1. Fabrication of various membranes. (a) PVA/PAA membrane, (b) PVDF membrane and (c) DTMS coated on the PVDF

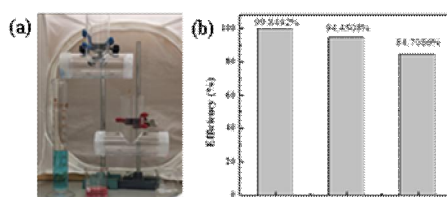


Fig. 2. Demonstration and efficiency separation of 3-type-liquids

#### Reference

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