

Precise Liquid Control and Long-term Stability of Slippery-Liquid-Infused Nanofibrous Membrane for Anti-fouling Endoscope Lens

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Slippery-liquid-infused porous surfaces (SLIPS) has excellent performance due to its own dynamic self-healing function. The membrane for endoscope prepared by using this technology has excellent anti-fouling and anti-fog ability. However, there are some problems in this membrane, such as not advanced manufacturing process, uneven surface of the SLIPS film, and ineffective maintenance of lubricating fluid, which will make them difficult to promote and use. In here, a novel method for preparing uniform lubricated nanofiber membranes is reported. It is formed by transferring a self-standing fiber membrane to a porous PET sheet. Then we analyzed the diffusion properties of the wet liquid in the fiber and used the FAS solution coating to effectively avoid its excessive diffusion affecting the distribution of wet liquid in the membrane. By changing the application process of lubricating fluid, the amount of wet liquid can be also effectively controlled. Through the redesign of the process and method, we successfully prepared a SLIPS membrane with precise oil control for the endoscope and confirmed its long-term antifouling function. In summary, this report provides novel key process improvements that are important for their widespread use in anti-fouling endoscope lenses.

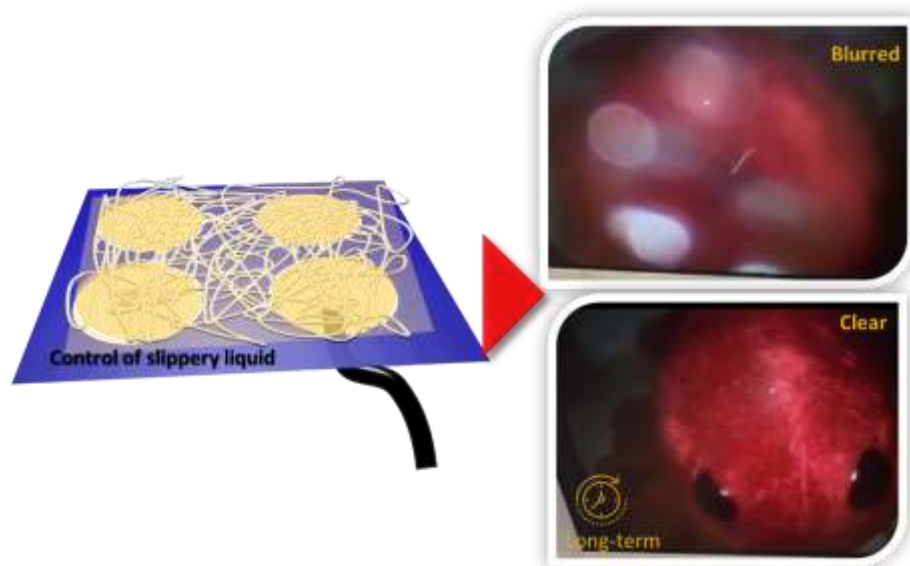


Figure 1. Schematic diagram of precise control content of SLIPS wet liquid and image comparison of endoscopic applications