

Abstract Submitted
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Robust and Drain Resistant Lubricated Omniphobic Fabrics¹

CASSIDEE KIDO², VIRAJ DAMLE, XIAODA SUN, AJAY ROOPESH, KYLE DOUDRICK³, KONRAD RYKACZEWSKI, Arizona State University — The implications of omniphobic fabrics range from stainproof clothing to civilian and military protection from chemical weapons. The challenge comes in developing a product that remains effective in repelling droplets of liquids with a wide range of surface tensions even after being subjected to various stimuli imposed by human use. Omniphobic fabrics can be made by infusing hydrophobic nanoparticle coated fibers with a low surface energy lubricant [1]. These types of lubricant impregnated surfaces can shed large deposited droplets as well as condensed microdroplets of variety of low surface tension liquids [2]. However, here we show that lubricated omniphobic fabrics can easily lose their properties due to degradation of the nanostructure coating or drainage of the lubricant upon contact with a porous surface. We also demonstrate that this issue can be resolved with use of cross-linked polymer coated fibers that are swollen with the lubricant. Use of flexible polymers avoids structure degradation due to fabric deformation, while swelling of the polymer with lubricant minimizes lubricant drainage upon contact maintaining the omniphobic characteristics of the fabric. [1] Shillingford, C. et al. *Nanotechnol.* 2014, 25, 014019. [2] Rykaczewski, K et al. *Sci. Rep* 2014, 4.

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