

Abstract Submitted
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Development of lubricant impregnated organogel surface for sustainable high drag reduction¹ JAEHYEON LEE, GUN YOUNG YOON, SANG JOON LEE, Pohang Institute of Science and Technology — Lubricant-infused surfaces (LIS) where micro/nanostructured surfaces are infused with lubricating liquids have attracted much attention due to their slippery properties for drag reduction. However, most state-of-the-art LIS technologies require complex fabrication processes and suffer from depletion problem of the infused lubricant, which limit their scalability and sustainability of high performance. Thus, a new strategy is proposed to overcome these problems by utilizing lubricant-impregnated organogel surfaces (LIOS) for efficient and sustainable drag reduction. In this LIOS, a lubricating liquid is dispersed in a solid 3D cross-linked network assimilated through physical or chemical interactions. Owing to its distinctive liquid absorption and retention capacity, the proposed LIOS might work out the lubricant depletion problem. The LIOS exhibited an extremely low sliding contact angle of 1.2 ± 0.2 , indicating a highly slippery surface. Due to the high slippery feature, the organogel had a large slip length of $209.4 \mu\text{m}$, which gives rise to high drag reduction. The present results demonstrate a new strategy for LIS system of low cost and sustainable high drag reduction.

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