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Longevity of underwater superhydrophobic surfaces for drag reduction[1] MUCHEN XU, CHANG-JIN "CJ" KIM, Univ of California - Los Angeles — The superhydrophobic (SHPo) surfaces capable of drag reduction are usually metastable under water and undergo wetting transition from dewetted (Cassie-Baxter) to wetted state (Wenzel). On the other hand, the SHPo surfaces capable of staying dewetted indefinitely under water unfortunately provide little drag reduction. In order to develop drag-reducing SHPo surfaces for underwater applications some day, it is critical to understand the wetting transition of SHPo surfaces. However, unlike the case of droplets in air, the wetting transition of SHPo surfaces under water is complicated and not fully understood. Based on our recent report, where $\sim$ 100 microns-wide trenches maintained the dewetted state indefinitely (measured >50 days), we will explain why the wetting transition occurs much easier in reality than the theoretical predictions. We are also expanding the longevity study from the current static condition to flow conditions including turbulent boundary-layer flows.

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