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Morphology Regulation of Liquid-Gas Interface on Bioinspired Super-Repellent Surface YAOLEI XIANG, PENGYU LV, HUILING DUAN, Department of Mechanics and Engineering Science,College of Engineering, Peking University, Beijing 100871, P. R. China — Bioinspired underwater super-repellent surfaces have many excellent properties, which attribute to the air mattress trapped on the surface. However, instability and collapse of the underwater slippery air mattress hinder its applications, after which the air mattress is difficult to recover. Here, we find that the unique hierarchical structures on the leaf surface of a famous invasive floating fern, Salvinia, have the capacity to replace the impregnated water with air and entirely recover the air mattress. We reveal the underlying mechanisms of the recovery process. The interconnected wedge-shaped grooves on the bottom are key to the recovery, which spontaneously transport the replenished air to the entire surface governed by a gas wicking effect. Moreover, inspired by the nature of Salvinia, we fabricated artificial Salvinia surfaces using three-dimensional printing technology, which successfully achieves a complete recovery of a continuous air mattress to exactly imitate the super-inflatable capability of Salvinia leaves.

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