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Electronic Supplementary Information

Superhydrophobic helix: Controllable and directional bubble transport in aqueous environment

Cunming Yu[b], Xuanbo Zhu[c], Moyuan Cao*[a], Cunlong Yu[c], Kan Li[c], Lei Jiang*[c]

a.School of Chemical Engineering and Technology, Tianjin University, and Collaborative Innovation Center of Chemical Science and Engineering, Tianjin 300072, P. R. China. E-mail: moyuan.cao@tju.edu.cn
b.Beijing National Laboratory for Molecular Sciences (BNLMS), Key Laboratory of Green Printing, Instituted of Chemistry, Chinese Academy of Sciences, Beijing 100190, P. R. China.
c.Key Laboratory of Bio-inspired Materials and Interfacial Science, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing 100190, P. R. China. E-mail: jianglei@iccas.ac.cn

This file contains Supplementary Figures S1-S6 with legends and Movie S1 and S2.

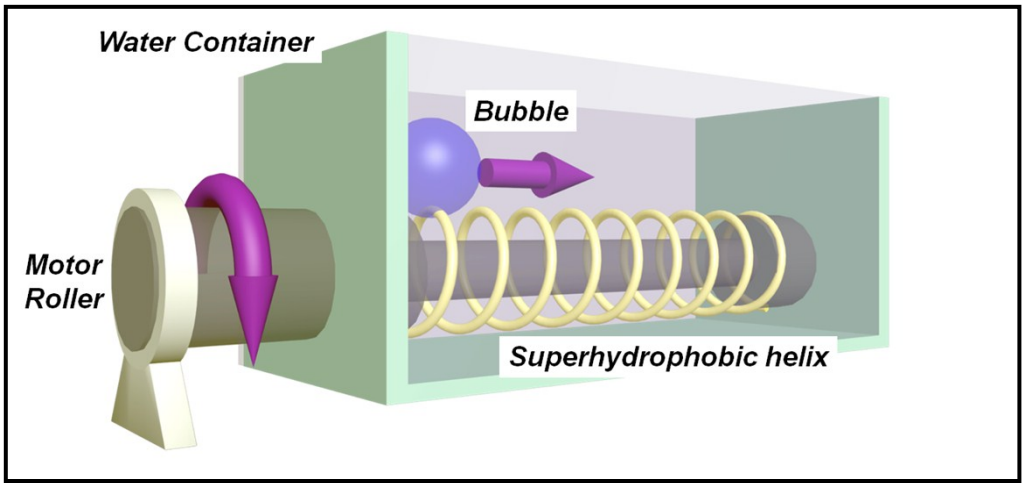

Fig. S1. The illustration of the experimental set-up.

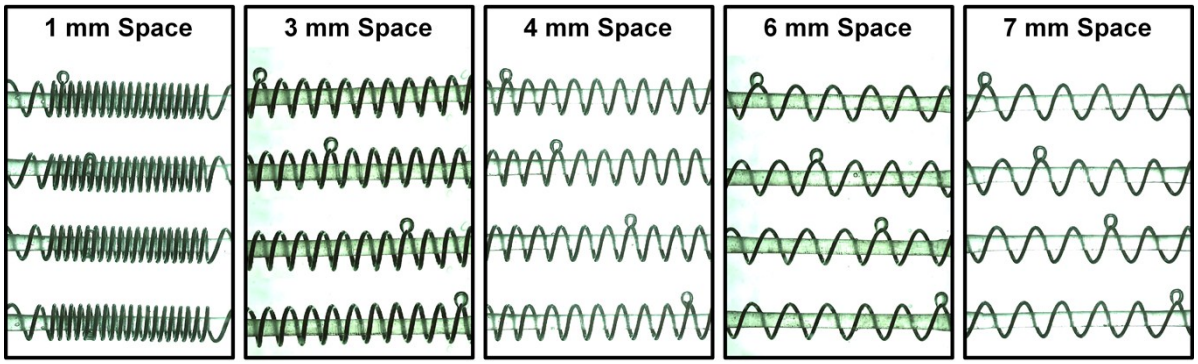

Fig. S2. Bubble transporting process based on the superhydrophobic helix with spacing lengths of 1 mm, 3 mm, 4 mm, 6 mm, and 7 mm. Of note, a 20 μL bubble was trapped into the narrow gap with two wires of the helix with 1 mm space. During the transporting process, the disturbance could cause the bubble trapping, resulting in a failed bubble delivery.

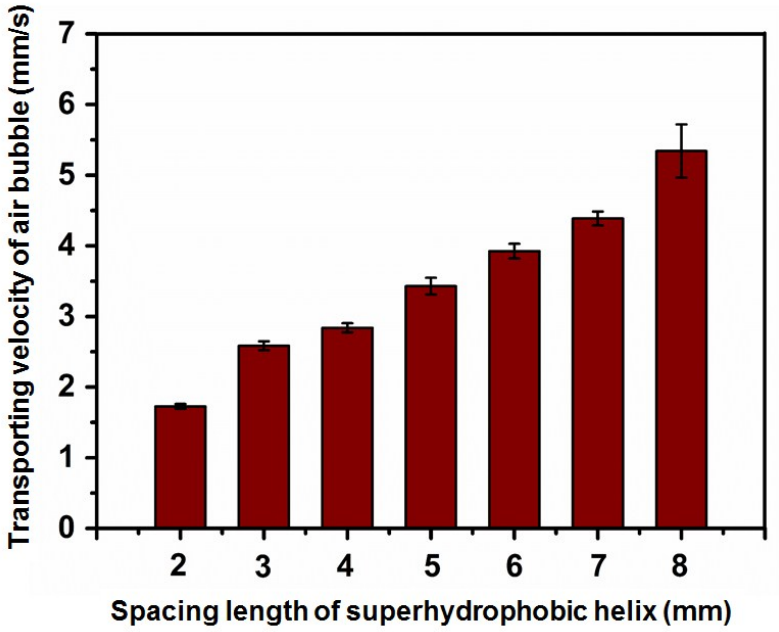

Fig. S3. The relation between the spacing length of superhydrophobic helix and bubble transporting velocity under a rotation rate about 40 rpm.

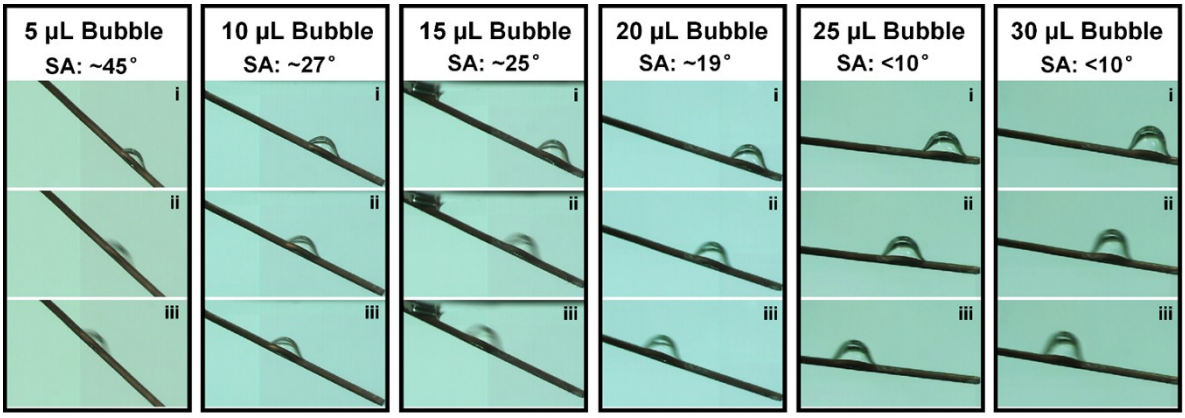

Fig. S4. The critical sliding angles of bubbles with different volumes on superhydrophobic copper wire.

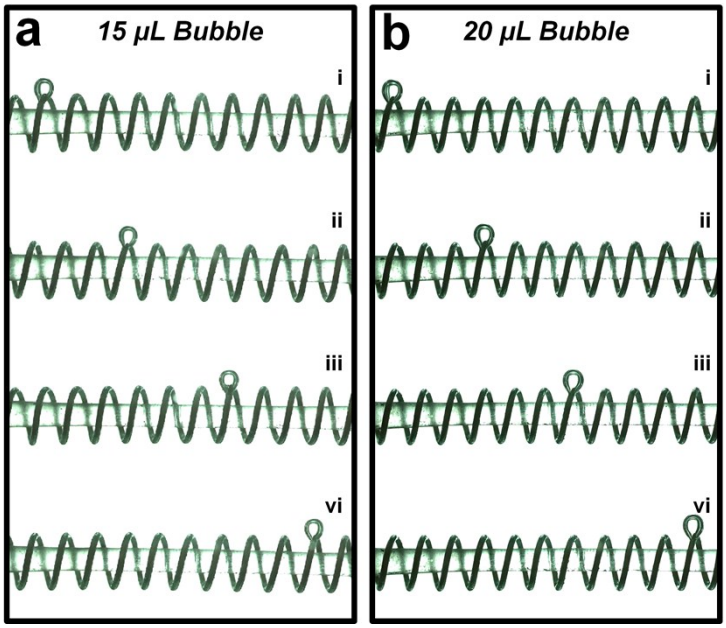

Fig. S5. The transporting process of bubbles with different volumes (15 μL and 20 μL) on superhydrophobic helix with 3 mm space.

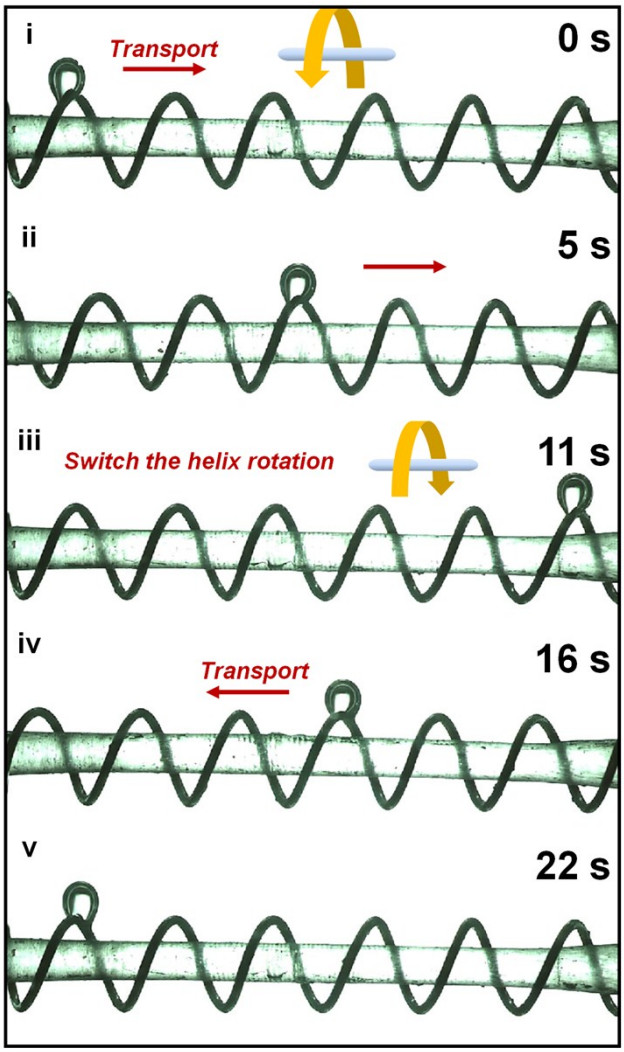

Fig. S6. The reciprocating bubble motion on the superhydrophobic helix through in situ switch of the direction of helix rotation.

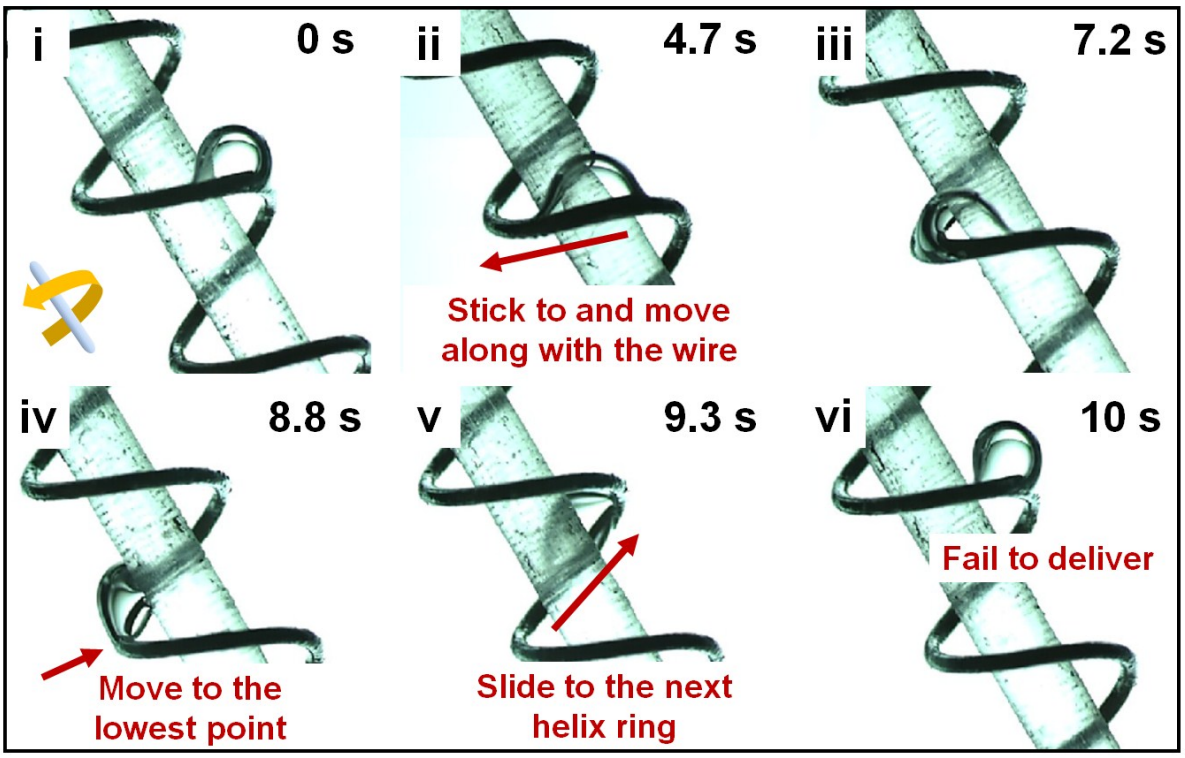

Fig. S7. The detailed snapshots of a fail anti-buoyancy bubble delivery. On the condition that the traction of helix rotation is larger than the resultant force of the buoyancy and the adhesion of bubble, (i)-(iii) the bubble starts to move downwards and along with the motion of helix wire. After (iv) the bubble reaches the lowest point of helix ring, (v)-(vi) it will rapidly slide to the upper helix ring, revealing a failure of anti-buoyancy bubble delivery.