

Supporting information

A facile bacterial assisted electrochemical self-assembly of polypyrrole micro-pillars: towards underwater low adhesive superoleophobicity

Zhe Cheng,^{‡a} Chunmei Ding,^{‡a} Huan Liu,^{*a} Ying Zhu,^a and Lei Jiang^{a,b}

^a Key Laboratory of Bio-Inspired Smart Interfacial Science and Technology of Ministry of Education, School of Chemistry and Environment, Beihang University, Beijing, 100191, P. R. China

E-mail: liuh@buaa.edu.cn

^b Beijing National Laboratory for Molecular Sciences, Institute of Chemistry, Chinese Academy of Sciences, Beijing, 100190, P. R. China

1: FT-IR spectrum of the as-prepared PPy-MP film.

In the FT-IR spectrum, the absorption band at 1527.4 cm⁻¹ is assigned to the pyrrole ring, *e. g.* the combination of C=C and C-C stretching vibration. The band at 1404 cm⁻¹ is associated with C-N stretching vibration. C-H deformation vibrations is showed at bands 1047.2 cm⁻¹. The bands 1173 cm⁻¹ and 902 cm⁻¹ are assigned to the stretching vibration of oxidized PPy. In addition, the strong absorption at 3419 cm⁻¹ and weak absorption at 2939 cm⁻¹, assigned as N-H and C-H stretching, respectively. Accordingly, all characteristic bands of PPy were observed, which showed identical doped PPy.¹

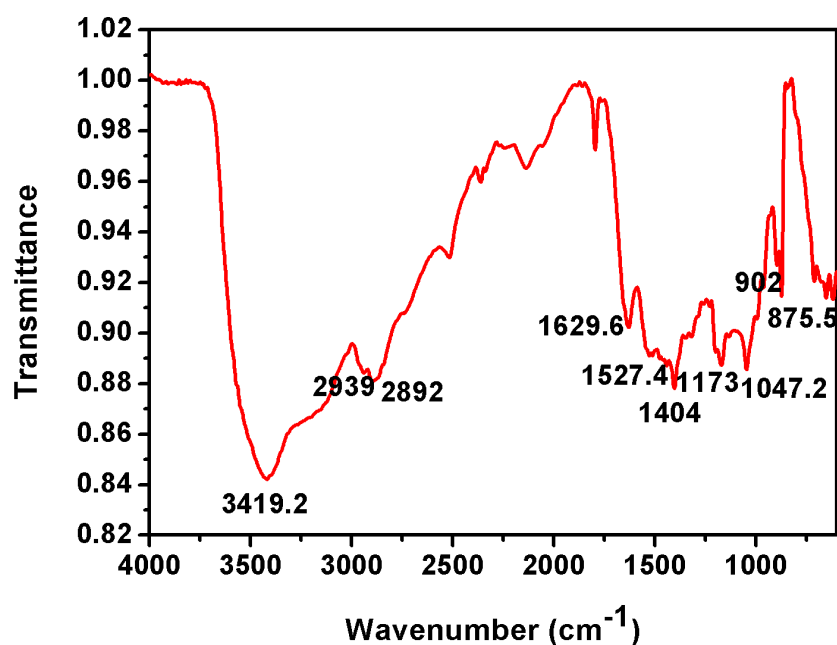


Fig S1 FT-IR spectrum of as-prepared PPy-MP film, confirming the typical PPy molecular structure.

2. The high-magnified SEM image of the as-prepared PPy-MP taken in different area. PPy-MP were clothed by PPy homogeneously and oriented mostly in a long-axis direct.

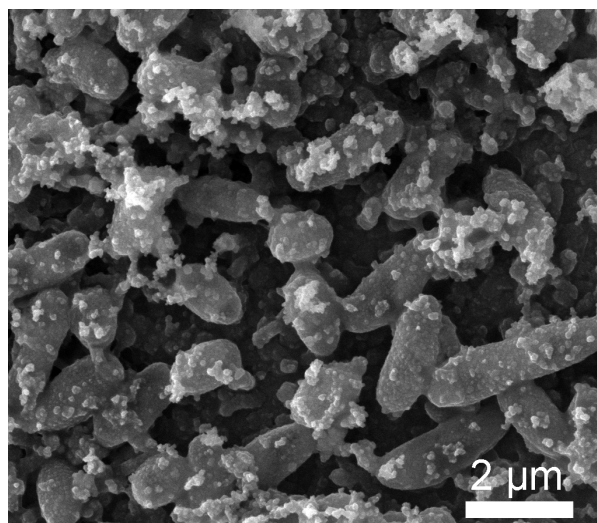


Fig. S2 The high-magnified SEM image of the as-prepared PPy-MP.

3: The water contact angle measurement on the as-prepared PPy-MP film and the cauliflower-like PPy film in air, respectively, exhibiting superhydrophilicity in air

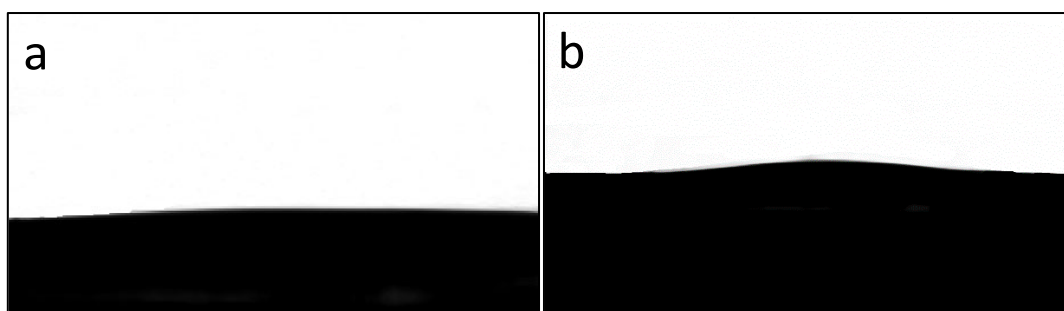


Fig. S3 The shape of a water drop on (a) PPy-MP film and (b) cauliflower-like PPy film both exhibit superhydrophilic property in air ($CA \approx 0^\circ$).

4: XPS Cl_{2p} spectrum of as-prepared PPy-MP.

The X-ray photoelectron spectroscopy (XPS) spectrum of PPy-MP was conducted on a VG ESCALAB 220i-XL instrument with a mono-chromatic Al Ka X-ray source. It's clearly proved in Fig. S4 that PPy was doped by Cl^- .

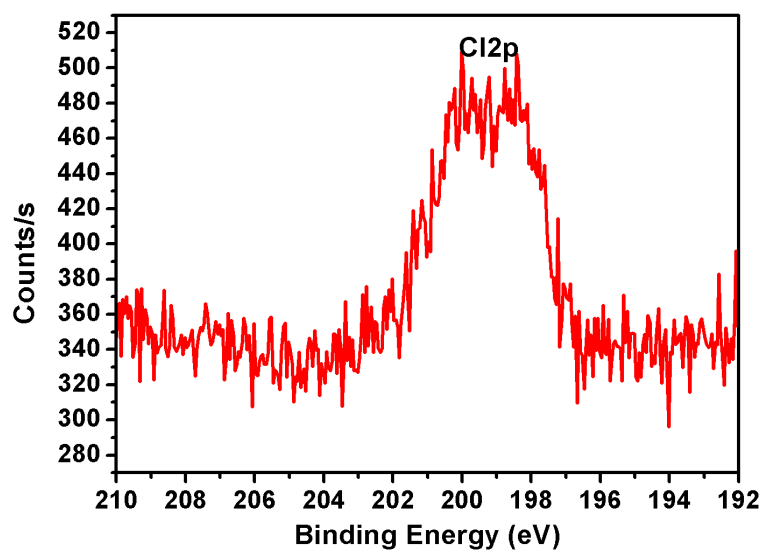


Fig. S4 XPS Cl_{2p} spectrum of as-prepared PPy-MP.

References:

- 1 (a) X. Li, M. Wan, Y. Wei, J. Shen and Z. Chen, *J. Phys. Chem. B*, 2006, **110**, 14623; (b) Deepak P. Dubal, Sang Ho Lee, Jong Guk Kim, Won Bae Kim and Chandrakant D. Lokhande *J. Mater. Chem.*, 2012, **22**, 3044; (c) Lin Jin, TingWang, Zhang-Qi Feng, Meiling Zhu, Michelle K. Leach, Youssef I. Naime and Qing Jiang, *J. Mater. Chem.*, 2012, **22**, 18321.