

Cover Page for Supplementary Materials

Manuscript title:

Performance improvement and biofouling mitigation in osmotic microbial fuel cells via *in situ* formation of silver nanoparticles on forward osmosis membrane

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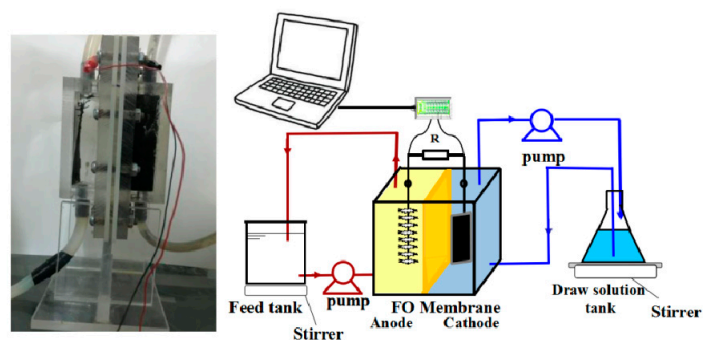


Figure S1 Schematic diagram of the OsMFC.

Table S1 Composition of the synthetic wastewater.

Composition	Concentration (mg/L)
glucose	230.0
sodium acetate anhydrous	40.0
peptone form fish	60.0
beef extract	20.0
NH_4HCO_3	170.0
KH_2PO_4	12.0
CaCl_2	1.2
$\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$	2.4
$\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$	1.0
NaHCO_3	198

Table S2 EDX analyses of the pristine and modified active layer of TFC-FO membranes.

Element	Wt. %	
	Pristine membrane	Modified membrane
C	79.41	77.76
O	13.20	11.92
S	7.39	8.18
Ag	-	2.14

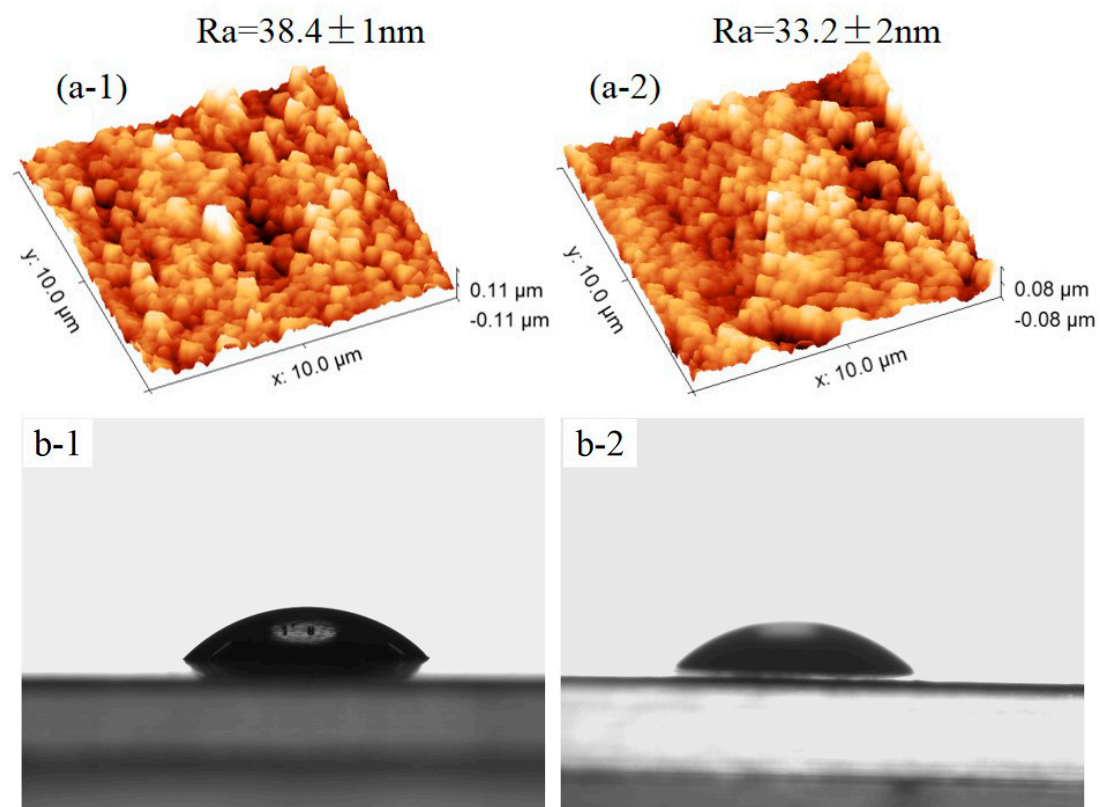


Figure S2 AFM micrographs (a) and contact angle micrographs (b) of the pristine (1) and modified (2) active layer of TFC-FO membranes.

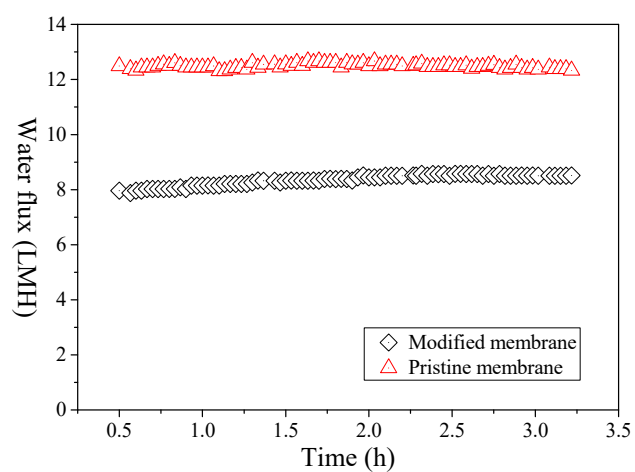


Figure S3 Water flux of the pristine and modified TFC-FO membranes determined by the FO-Cell using synthetic wastewater as the feed solution and 1 M NaCl solution as the draw solution.

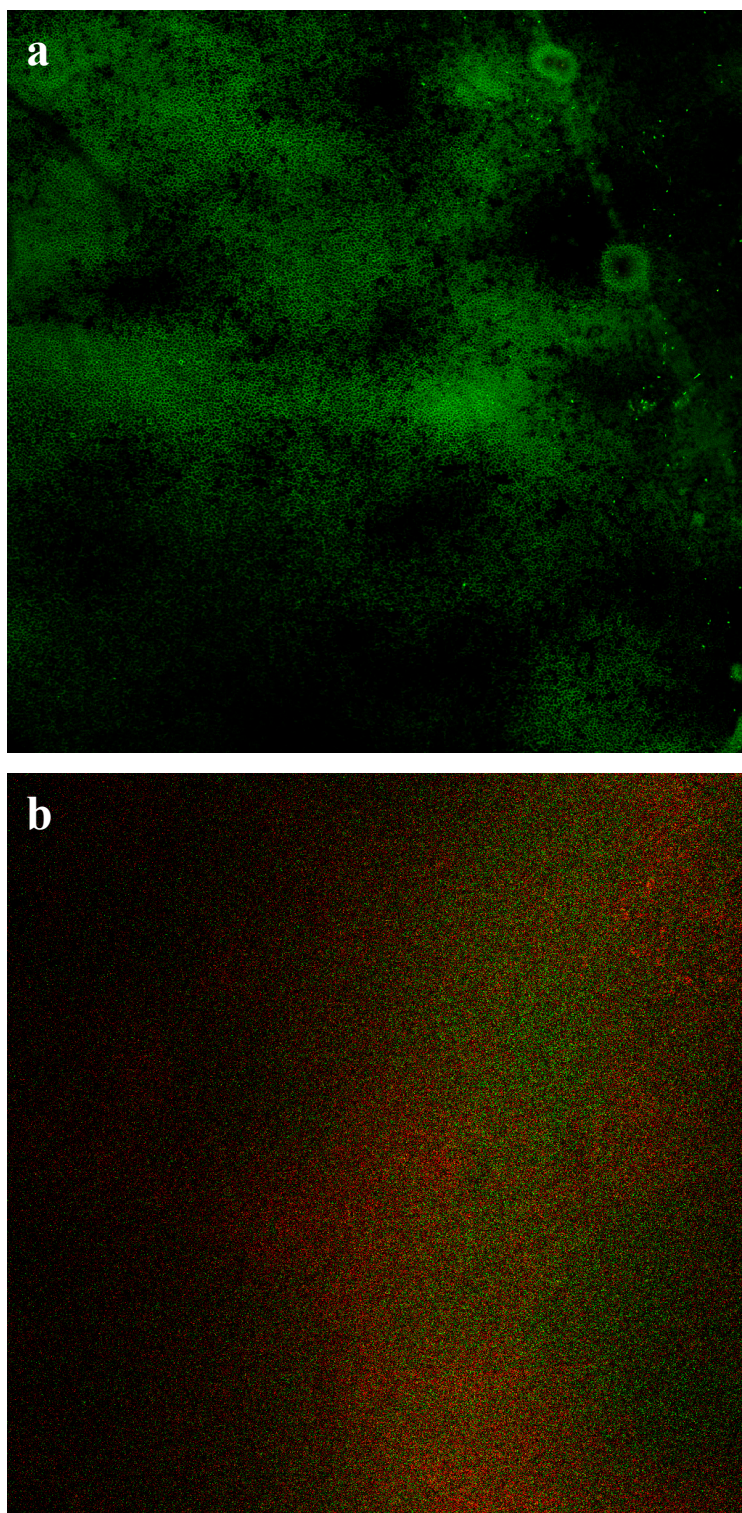


Figure S4 CLSM images of bacteria attached to the surface of the pristine (a) and modified (b) TFC-FO membranes.

Table S3 Properties of the foulants collected from the fouled pristine and modified TFC-FO membranes^a.

Index	Pristine membrane	Modified membrane
MLSS (mg/m ²)	32.0 ± 1.5	27.2 ± 1.2
MLVSS (mg/m ²)	28.8 ± 1.8	24.0 ± 1.1
MLVSS/MLSS	0.90 ± 0.08	0.88 ± 0.07

^a Values are given as mean values ± standard deviation (number of measurements: n = 3).

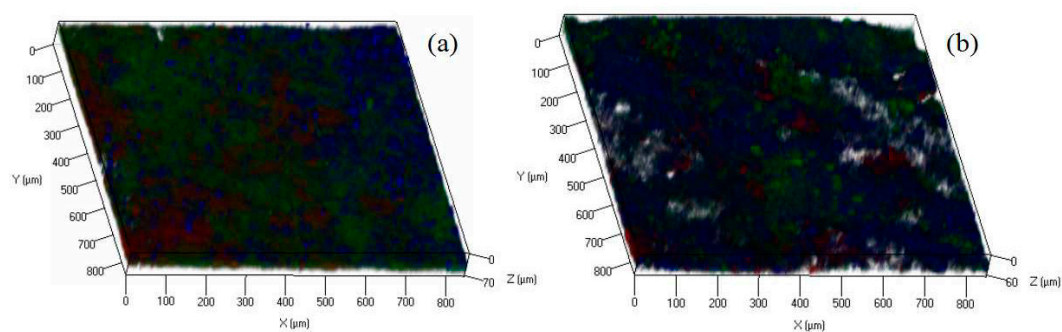


Figure S5 Integrated CLSM images of polysaccharides (blue), proteins (green) and microorganisms (red) in the biofouling layer of the pristine (a) and modified (b) TFC-FO membranes.

Table S4 Biovolume and mean thickness of the pristine and modified TFC-FO membranes^a.

Components	Membrane Type	α -D-Glucopyranose	β -D-Glucopyranose	Proteins	Total cells
Biovolume ($\mu\text{m}^3/\mu\text{m}^2$)	Pristine membrane	1.99 ± 1.68	11.53 ± 0.18	20.54 ± 0.10	15.44 ± 6.38
	Modified membrane	0.03 ± 0.04	11.95 ± 0.26	15.08 ± 0.08	9.67 ± 0.66
Mean thickness (mm)	Pristine membrane	28.62 ± 1.78	31.86 ± 0.56	38.31 ± 0.91	36.37 ± 1.41
	Modified membrane	26.43 ± 2.62	33.98 ± 1.70	36.95 ± 2.57	39.63 ± 0.06

^a Values are given as mean values \pm standard deviation (number of measurements: n = 3).