

Janus electrode of asymmetric wettability for H₂O₂ production with highly-efficient O₂ utilization

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Table S1. The contact angles of different electrodes.

Electrode	Surface	Contact Angles of Water (°)	Contact Angles of Gas (°)
Janus electrode	Hydrophobic GF	137.7	0
	Hydrophilic CL	74.7	-
Hydrophilic electrode	Hydrophilic GF	81.2	137.6
	Hydrophilic CL	76.7	-
Hydrophobic electrode	Hydrophobic GF	138.3	0
	Hydrophobic CL	132.6	-

Table S2. The dissolved oxygen concentrations of electrolyte solution with different O₂ flow rates.

O ₂ flow rate (mL min ⁻¹)	Dissolved oxygen concentration (mg L ⁻¹)			Average DO (mg L ⁻¹)
	1	2	3	
0	10.09	11.88	11.74	11.24 ± 0.81
0.25	10.24	12.22	12.07	11.51 ± 0.90
0.5	10.28	12.31	12.27	11.62 ± 0.95
1	11.24	12.76	12.33	12.11 ± 0.64
6	13.74	15.75	16.63	15.37 ± 1.21
60	39.03	37.53	38.02	38.19 ± 0.62

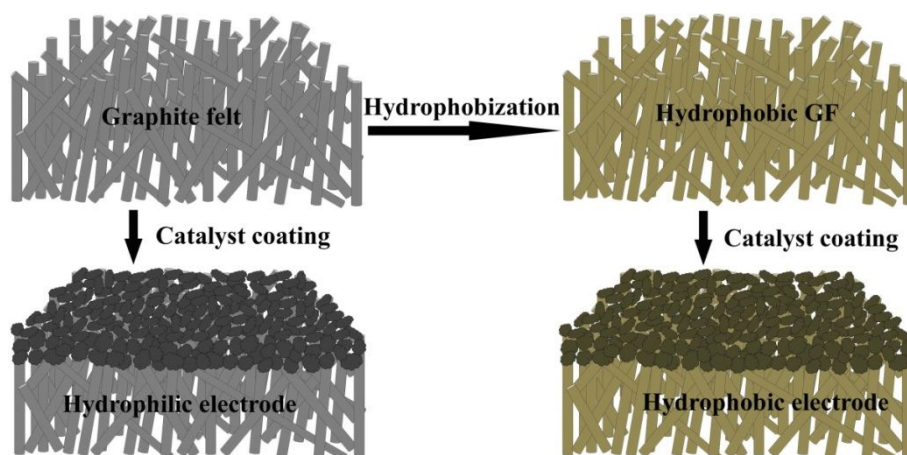


Figure S1. Fabrication schematic illustration of hydrophilic and hydrophobic electrodes.

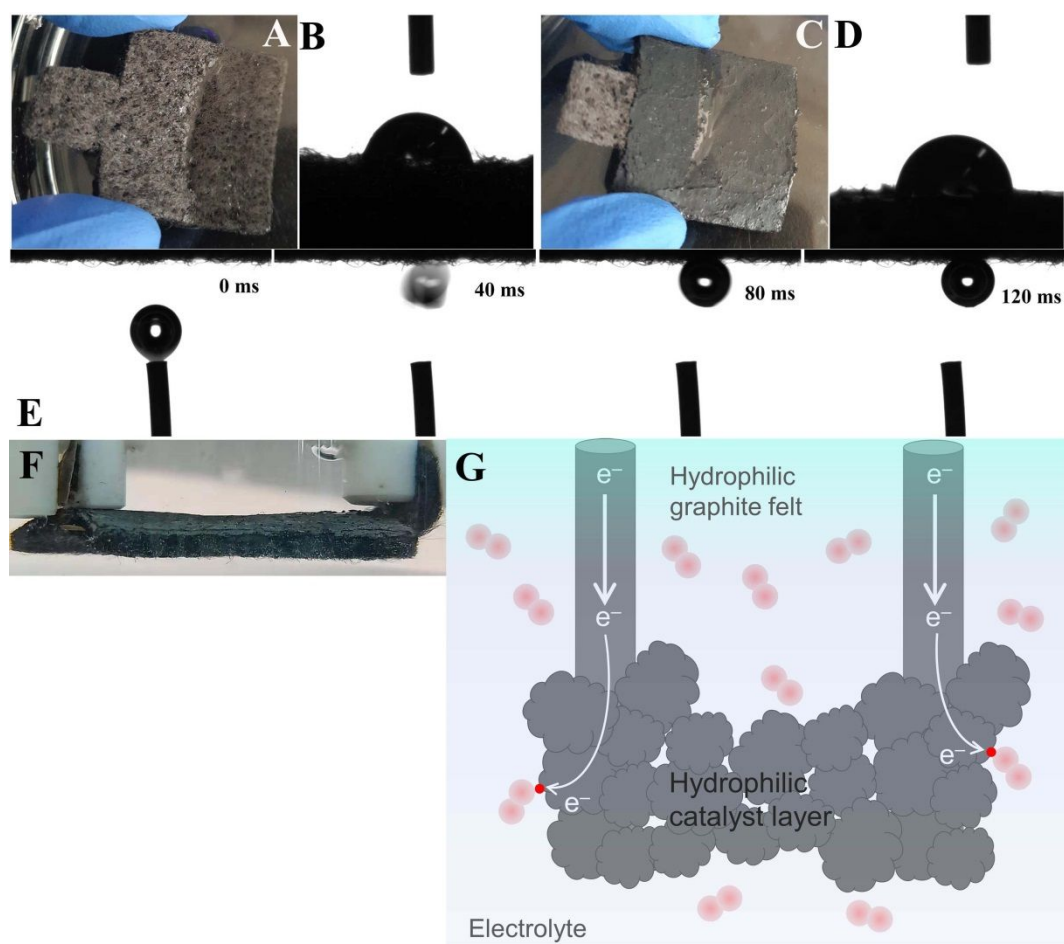


Figure S2. (A) Photograph and (B) water contact angle of graphite felt in hydrophilic electrode; (C) photograph and (D) water contact angle of hydrophilic catalyst layer in hydrophilic electrode; (E) gas contact angle of graphite felt in hydrophilic electrode; (F) side-view photograph and (G) schematic illustration of the hydrophilic electrode submerged in electrolyte.

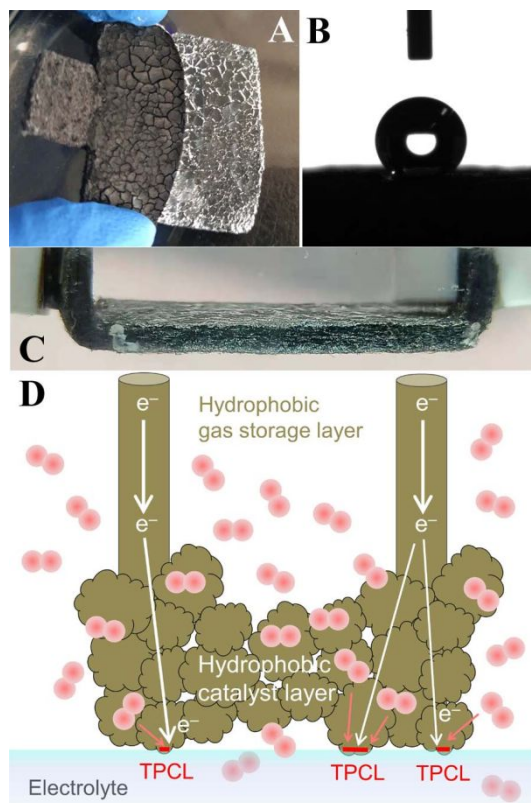


Figure S3. (A) Photograph and (B) water contact angle of hydrophobic catalyst layer in hydrophobic electrode; (C) side-view photograph and (D) schematic illustration of the hydrophobic electrode submerged in electrolyte.

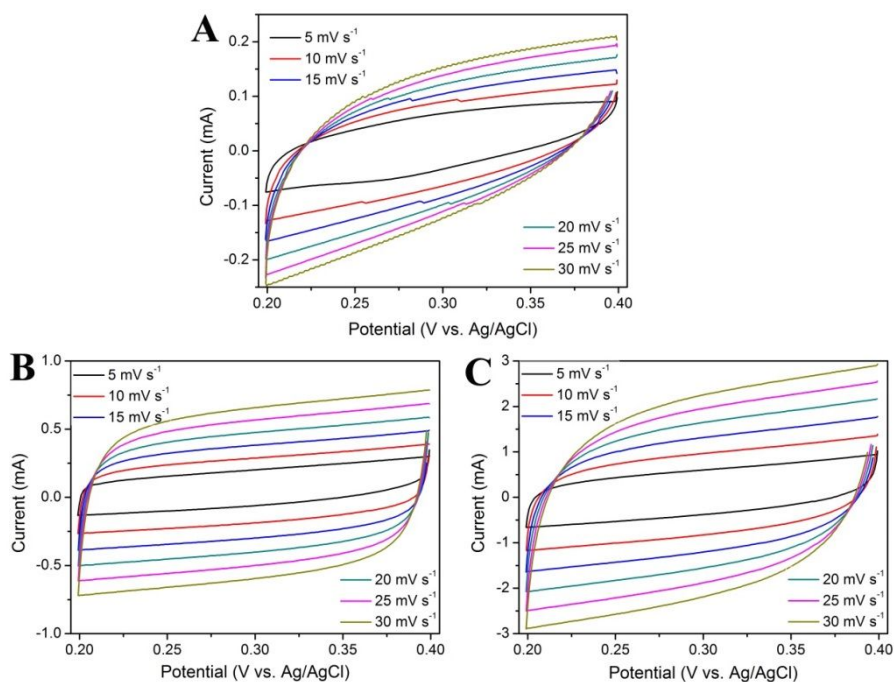


Figure S4. EDLC measurements of three electrodes, including (A) hydrophobic electrode, (B) Janus electrode and (C) hydrophilic electrode.

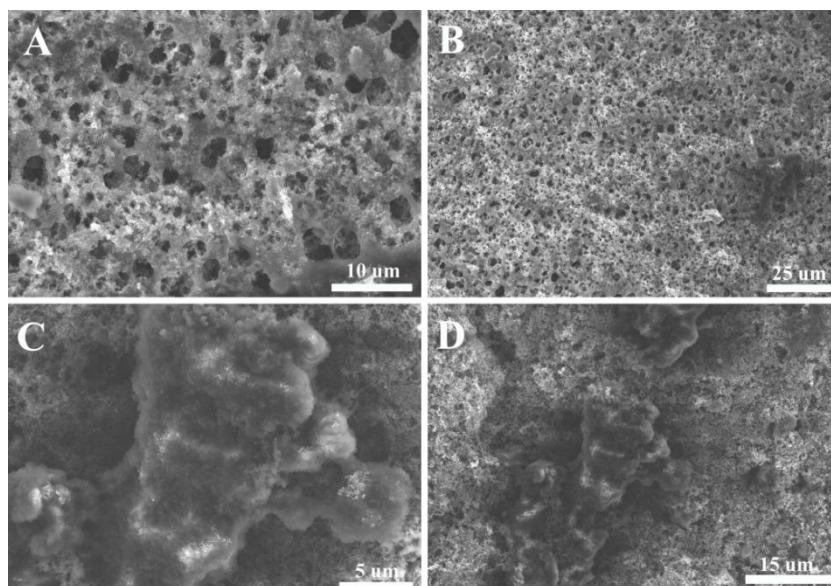


Figure S5. High-resolution and low-resolution SEM image of (A and B) hydrophilic and (C and D) hydrophobic catalyst layer.

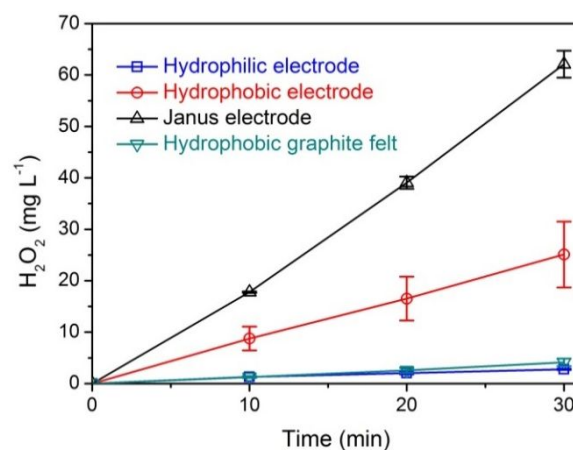


Figure S6. H₂O₂ productions with reaction time for the Janus, hydrophobic electrode, hydrophobic graphite felt and hydrophilic electrode with O₂ flow rate of 6 mL min⁻¹.

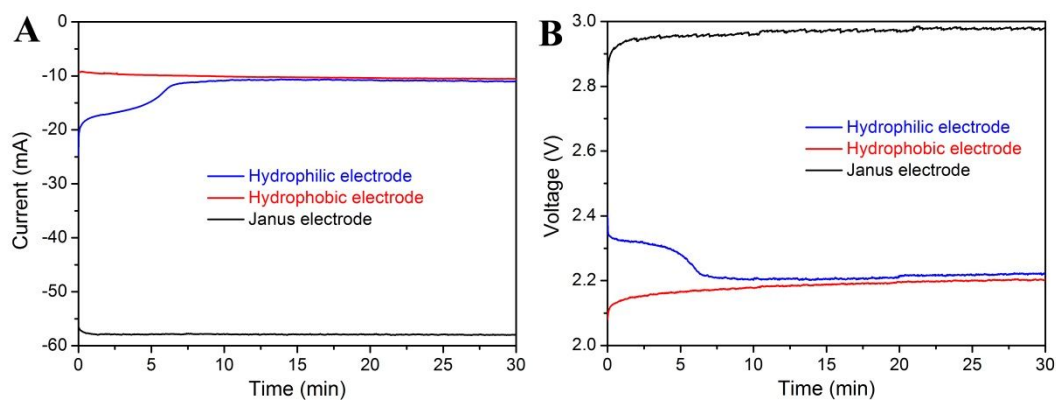


Figure S7. (A) Current and (B) voltage with time for the Janus, hydrophobic and hydrophilic electrodes at -0.4 V vs. Ag/AgCl with O₂ flow rate of 6 mL min⁻¹.