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Electronic Supplementary Information

Blocking the bimolecular pathway of water oxidation electrocatalyzed by a copper porphyrin with a surfactant

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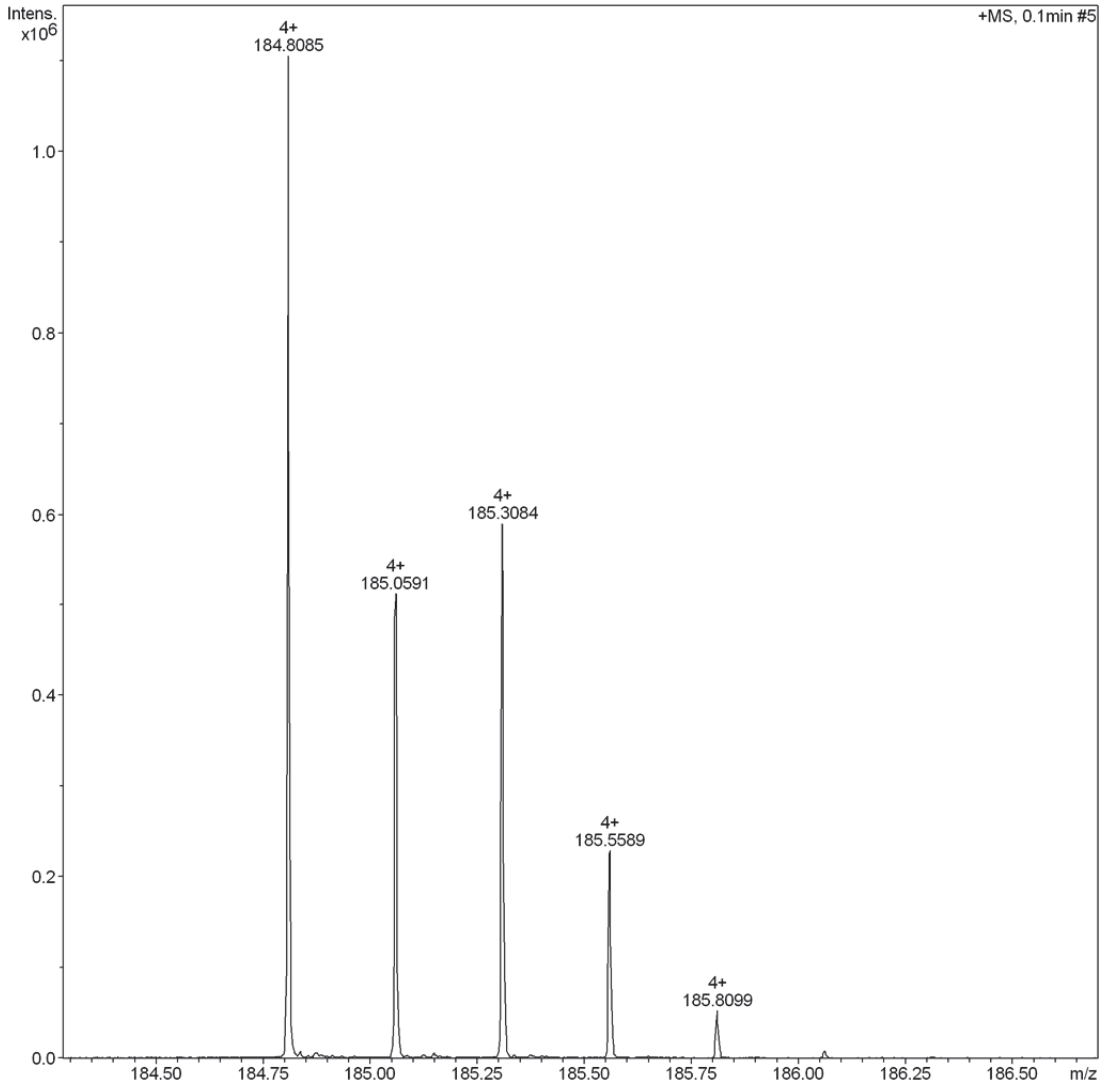

Fig. S1 HRMS of complex **1** showing ions at a mass-to-charge ratio of 184.8085 for $[Cu\text{-}TMPyP]^{4+}$.

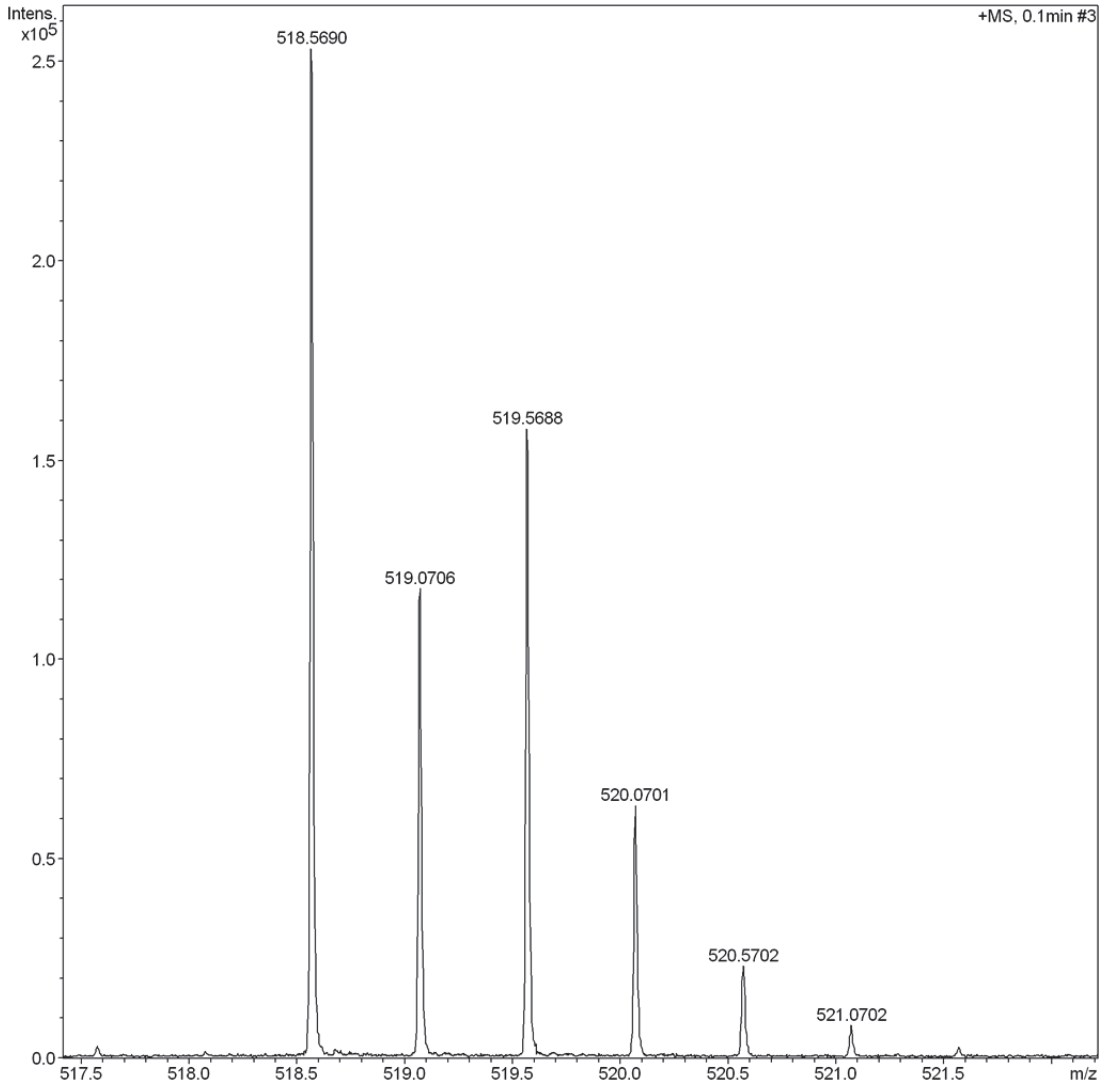

Fig. S2 HRMS of complex **1** showing ions at a mass-to-charge ratio of 518.5690 for $[Cu\text{-}TMPyP\text{-}(OTf)_2]^{2+}$.

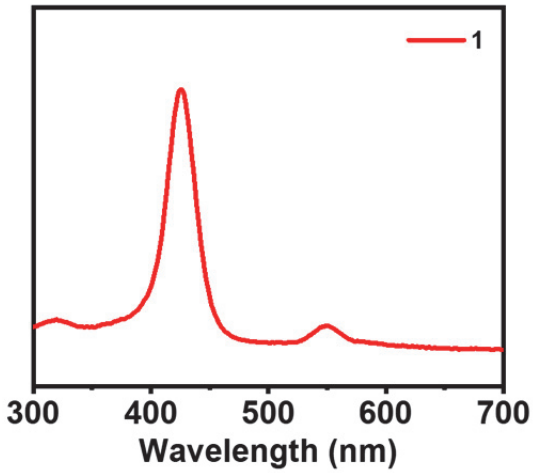

Fig. S3 UV-vis spectrum of complex **1**. Conditions: dry acetonitrile solution, 20 °C.

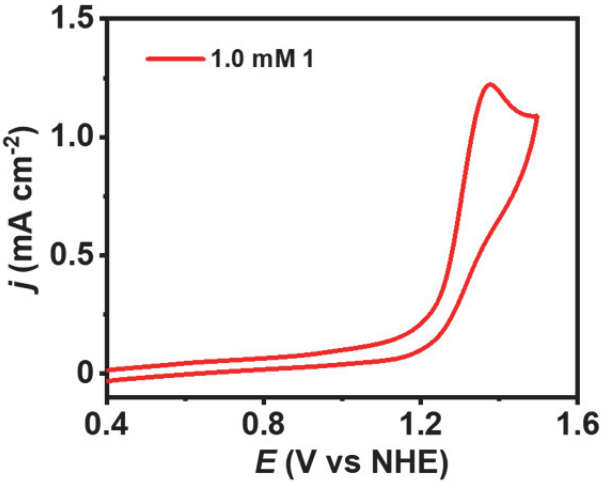

Fig. S4 CV of 1.0 mM **1** at 100 mV s^{-1} scan rate. Conditions: FTO working electrode (S = 0.25 cm^2), 0.1 M pH = 7.0 PBS, 20 °C.

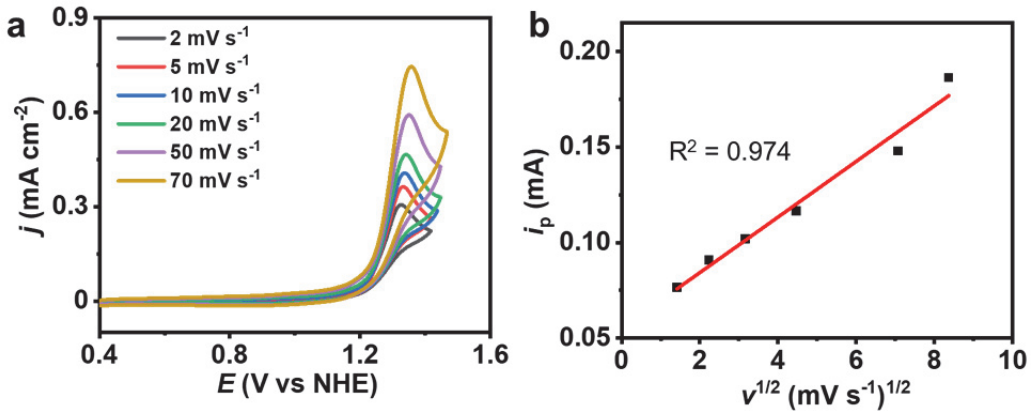

Fig. S5 (a) CVs of 1.0 mM **1** at different scan rates. Conditions: FTO working electrode (S = 0.25 cm^2), 0.1 M pH = 7.0 PBS, 20 °C. (b) Plot of catalytic peak currents versus the square root of scan rates ($v^{1/2}$), R^2 = 0.974.

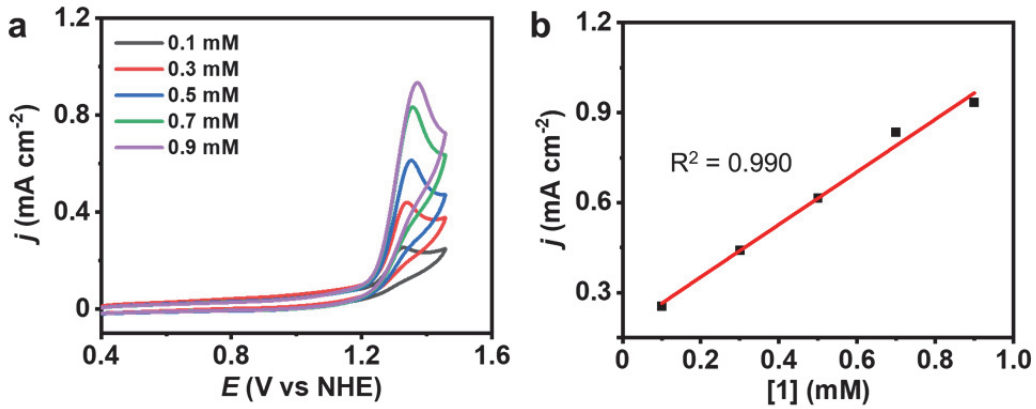

Fig. S6 (a) CVs of **1** at different concentrations. Conditions: FTO working electrode (*S* = 0.25 cm^2), 0.1 M pH = 7.0 PBS, 100 mV s^{-1} scan rate, 20 °C. (b) Plot of catalytic peak currents versus the concentrations of **1**, R^2 = 0.990.

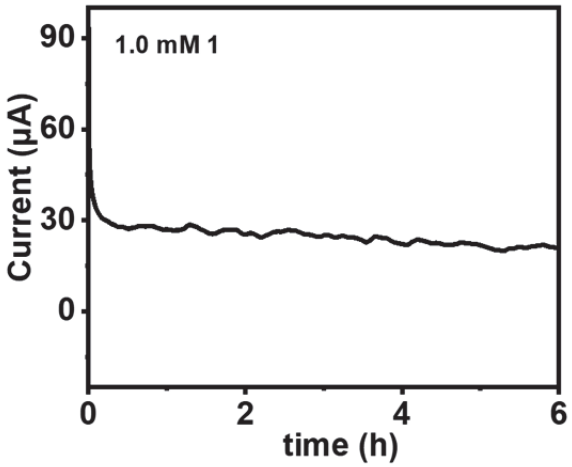

Fig. S7 CPE of 1.0 mM **1** at an applied potential of 1.30 V. Conditions: FTO working electrode (S = 0.25 cm^2), 0.1 M pH = 7.0 PBS, 20 °C.

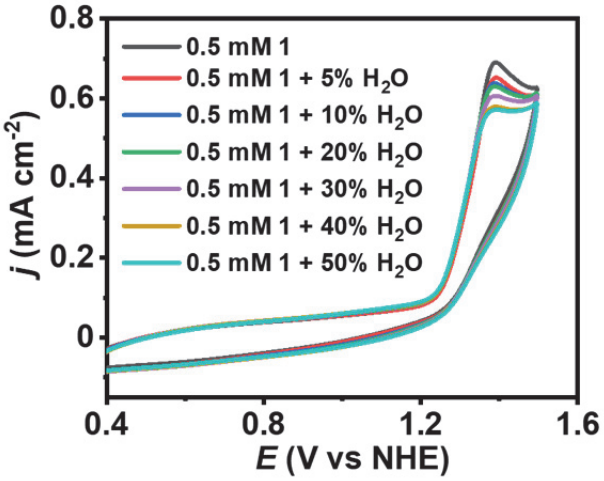

Fig. S8 CVs of 0.5 mM **1** + *x*% **H_2O** at 100 mV s^{-1} scan rate. Conditions: GC working electrode (S = 0.07 cm^2), 0.1 M pH = 7.0 PBS, 20 °C.

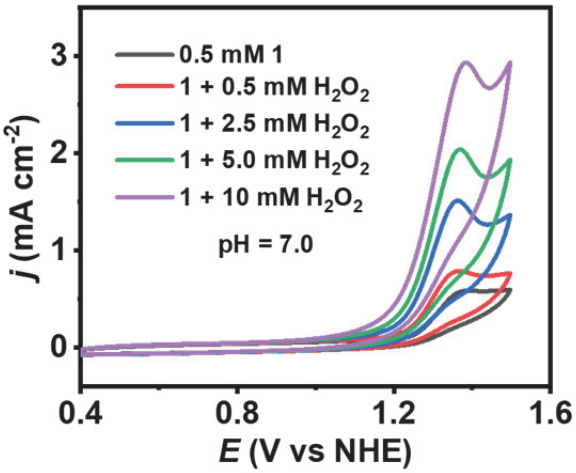

Fig. S9 CVs of 0.5 mM **1** with the addition of different concentrations of H_2O_2. Conditions: GC working electrode, 0.1 M pH = 7.0 PBS, scan rate 100 mV s^{-1}, 20 °C.

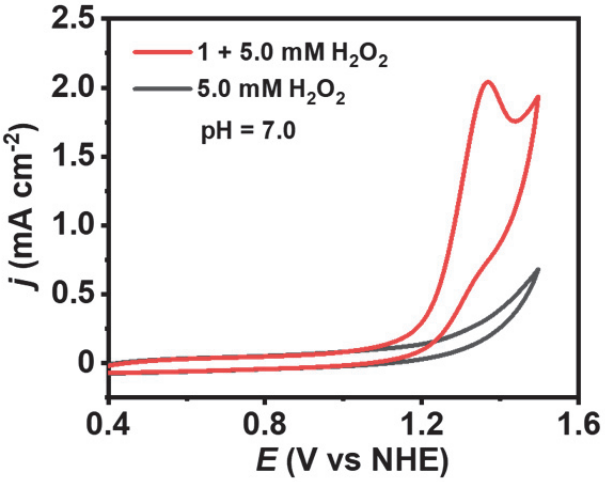

Fig. S10 CVs of 5.0 mM H_2O_2 with 0.5 mM **1**. Conditions: GC working electrode, 0.1 M pH = 7.0 PBS, scan rate 100 mV s^{-1}, 20 °C.

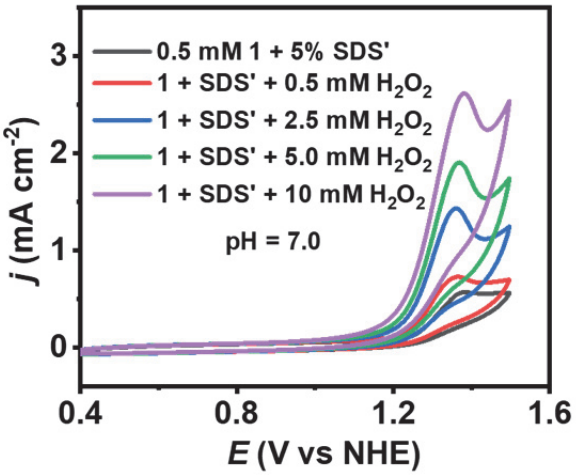

Fig. S11 CVs of 0.5 mM **1** + 5% **SDS'** with the addition of different concentrations of H_2O_2. Conditions: GC working electrode, 0.1 M pH = 7.0 PBS, scan rate 100 mV s^{-1}, 20 °C.

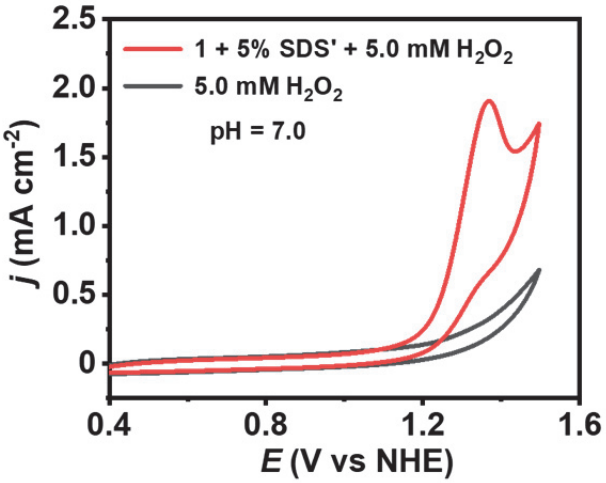

Fig. S12 CVs of 5.0 mM H_2O_2 with 0.5 mM **1** + 5% **SDS'**. Conditions: GC working electrode, 0.1 M pH = 7.0 PBS, scan rate 100 mV s^{-1}, 20 °C.

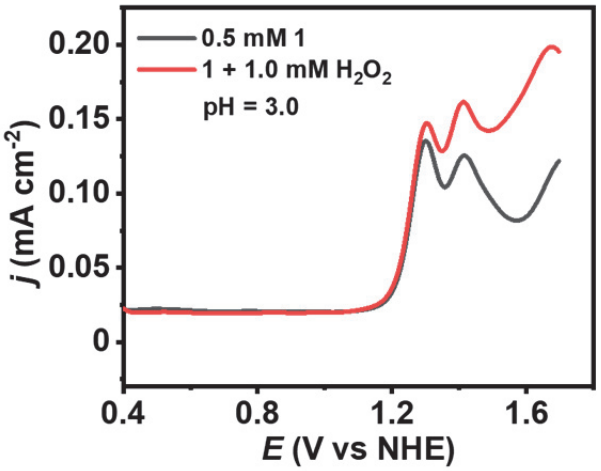

Fig. S13 DPVs of 0.5 mM **1** with the addition of 1.0 mM H_2O_2. Conditions: GC working electrode, 0.1 M pH = 3.0 PBS, 20 °C.

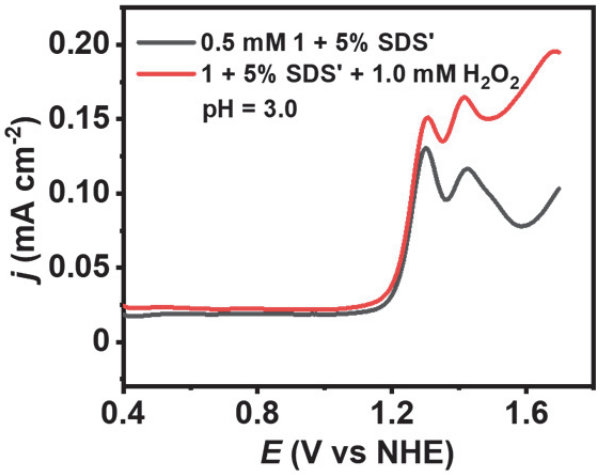

Fig. S14 DPVs of 0.5 mM **1** + 5% **SDS'** with the addition 1.0 mM H_2O_2. Conditions: GC working electrode, 0.1 M pH = 3.0 PBS, 20 °C.

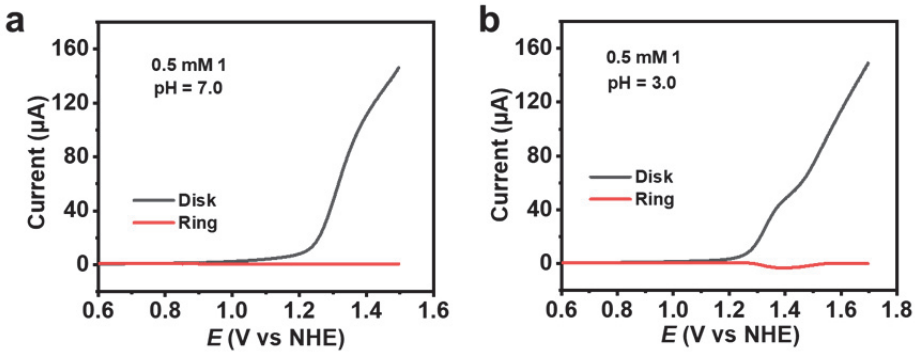

Fig. S15 (a, b) RRDE measurements of 0.5 mM **1** at 1000 rpm in 0.1 M pH = 7.0 and pH = 3.0 PBS. Conditions: Pt ring electrode at 0.70 V, scan rate 10 mV s^{-1}, 20 °C.

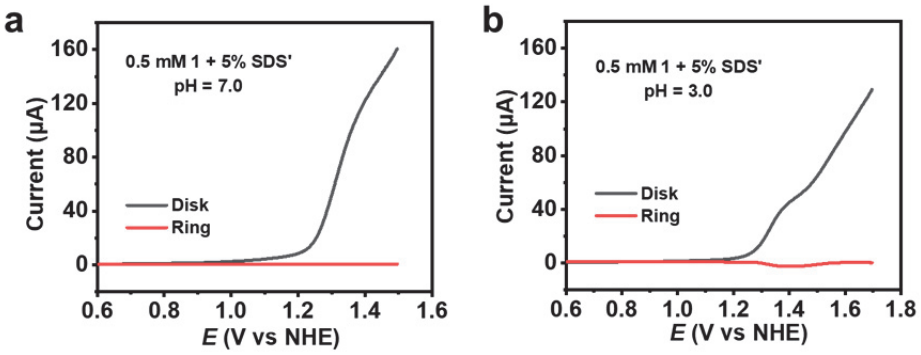

Fig. S16 (a, b) RRDE measurements of 0.5 mM **1** + 5% **SDS'** at 1000 rpm in 0.1 M pH = 7.0 and pH = 3.0 PBS. Conditions: Pt ring electrode at 0.70 V, scan rate 10 mV s^{-1}, 20 °C.

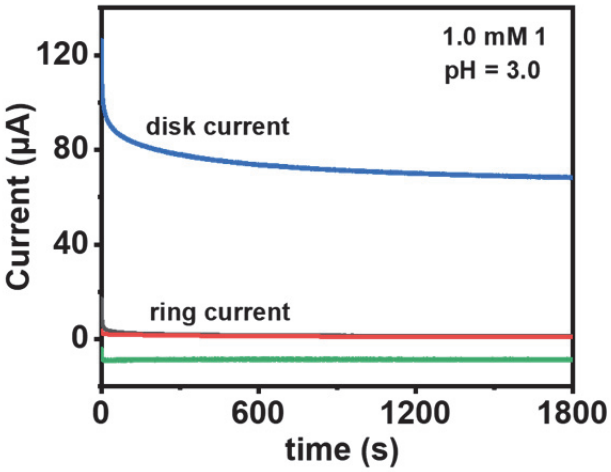

Fig. S17 (a) CPE measurements with 1.0 mM **1** (blue and green) or without **1** (black and red). Conditions: GC disk electrode at an applied potential of 1.40 V and Pt ring electrode at an applied potential at 0.70 V in a 0.1 M pH = 3.0 PBS at 1600 rpm, 20 °C.

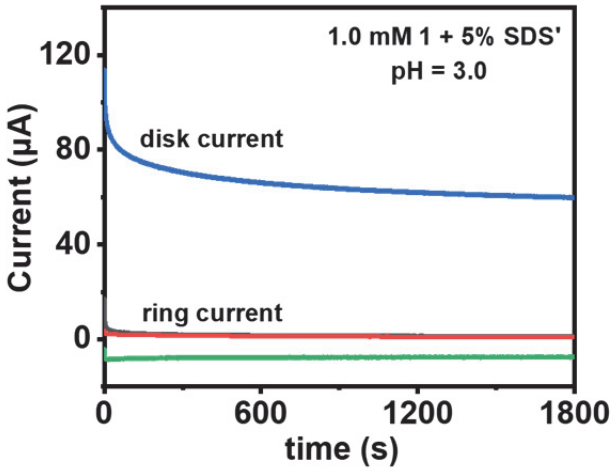

Fig. S18 (b) CPE measurements with 1.0 mM **1** + 5% **SDS'** (blue and green) and without **1** + 5% **SDS'** (black and red). Conditions: GC disk electrode at an applied potential of 1.40 V and Pt ring electrode at an applied potential at 0.70 V in a 0.1 M pH = 3.0 PBS at 1600 rpm, 20 °C.