

Supplementary Information

Chemical Synthesis of Highly Conducting Polypyrrole Nanofiber Film

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Element	Polypyrrole from 1M HCl system	Polypyrrole from CTAB/1M HCl system
C	57.35	55.81
H	4.16	4.33
N	16.73	15.83
O	14.47	16.51
S	2.99	4.37
Cl	4.34	2.28
Br	N/A	0.61
Total	100.04	99.74
Composition	$(Py)_1(SO_4^{2-})_{0.078}(Cl^-)_{0.1}(H_2O)_{0.44}$	$(Py)_1(SO_4^{2-})_{0.12}(Cl^-)_{0.057}(Br^-)_{0.0067}(H_2O)_{0.43}$

Table S1. Elemental Analysis of Polypyrrole Synthesized in 1M HCl System With/Without CTAB

Element	Polypyrrole synthesized in CTAB/water system
C	54.87
H	3.88
N	15.85
O	20.52
S	3.72
Br	0.37
Total	99.21
Composition	(Py)₁(SO₄²⁻)_{0.1027}(Br⁻)_{0.004}(H₂O)_{0.719}

Table S2. Elemental analysis of polypyrrole synthesized in DI water system with CTAB according to reference 6.

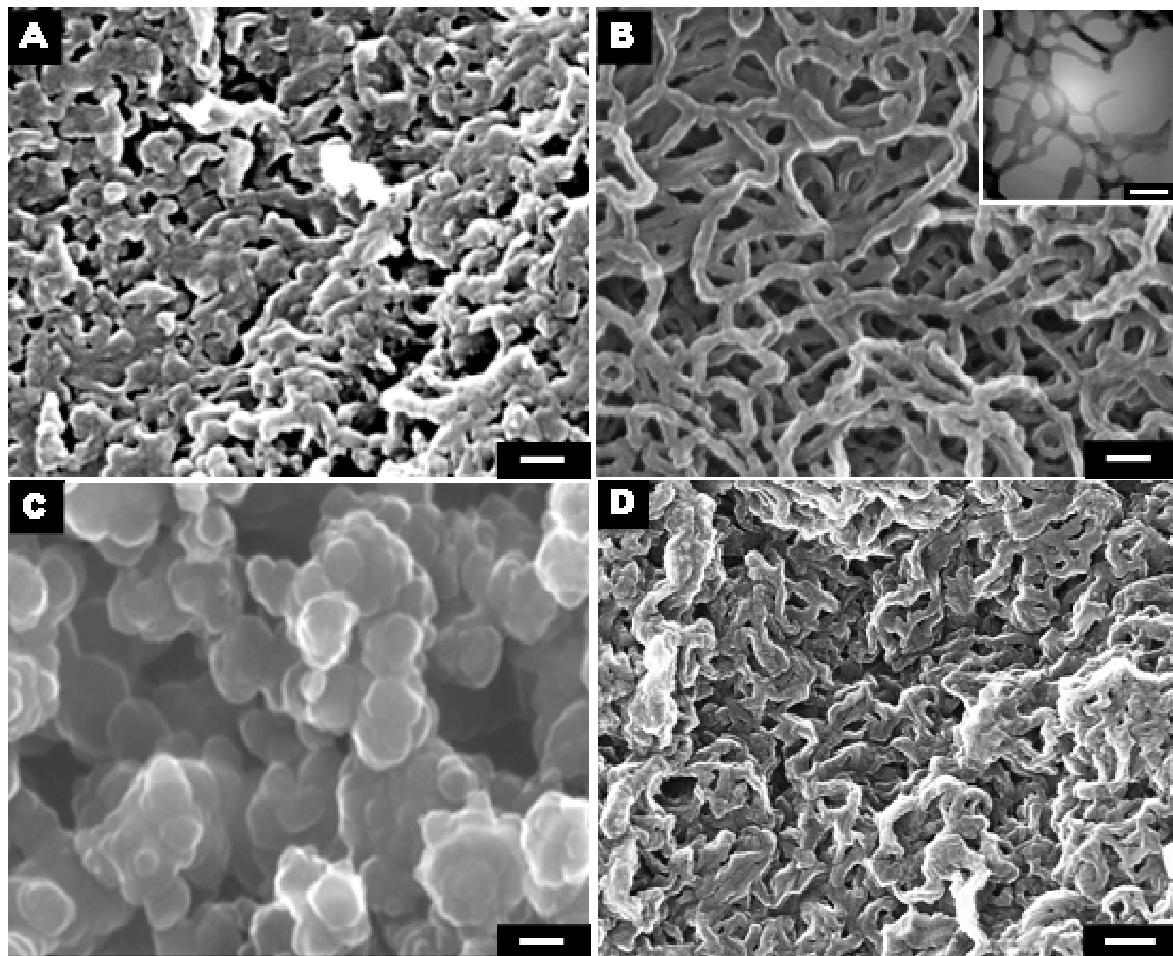


Figure S1. SEM images of doped polypyrrole synthesized using $(\text{NH}_4)_2\text{S}_2\text{O}_8$ oxidant in: (A) CTAB/deionized water. (B) CTAB/aq. 1 M HCl. (C) aq. 1 M HCl (no CTAB). (D) CTAB/aq. 0.5 M HCl. Inset in 'B': TEM image of polypyrrole film. Scale bar: 100 nm.

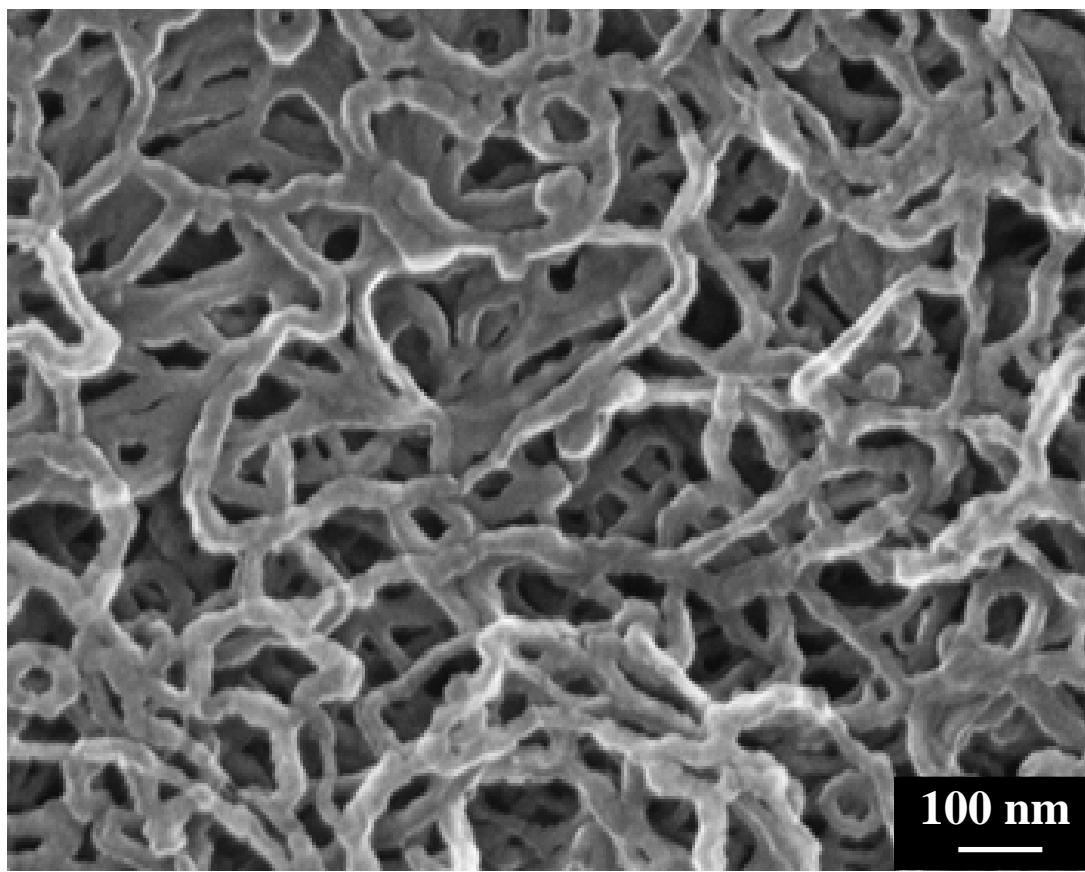


Figure S2. SEM images of doped polypyrrole synthesized using $(\text{NH}_4)_2\text{S}_2\text{O}_8$ oxidant in: CTAB/aq. 1 M HCl at 0 °C.

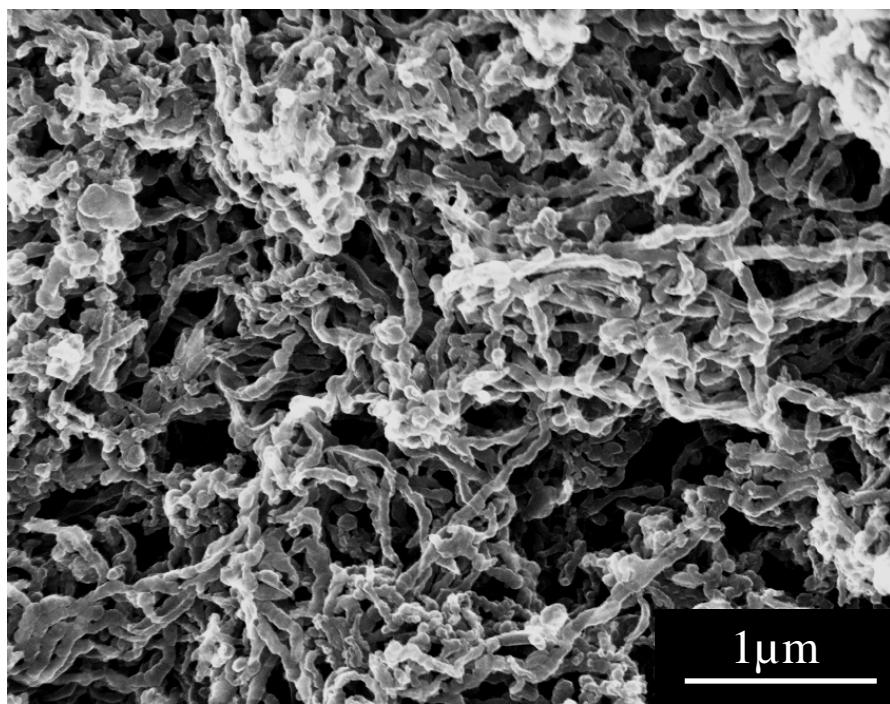


Figure S2. SEM image of doped polypyrrole synthesized using $(\text{NH}_4)_2\text{S}_2\text{O}_8$ oxidant in: CTAB/aq. 1 M HCl at room temperature.

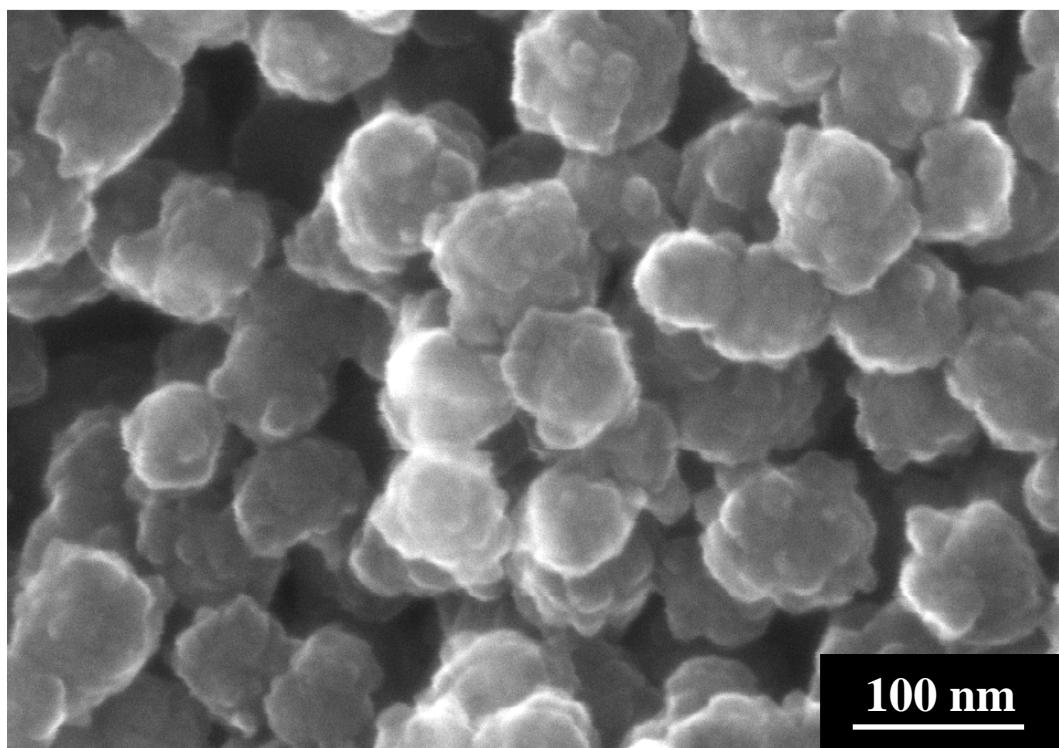


Figure S3. SEM image of doped polypyrrole synthesized using $(\text{NH}_4)_2\text{S}_2\text{O}_8$ oxidant in: CTAB/aq. 1 M HCl/0°C with cyclohexane added just prior to addition of $(\text{NH}_4)_2\text{S}_2\text{O}_8$.

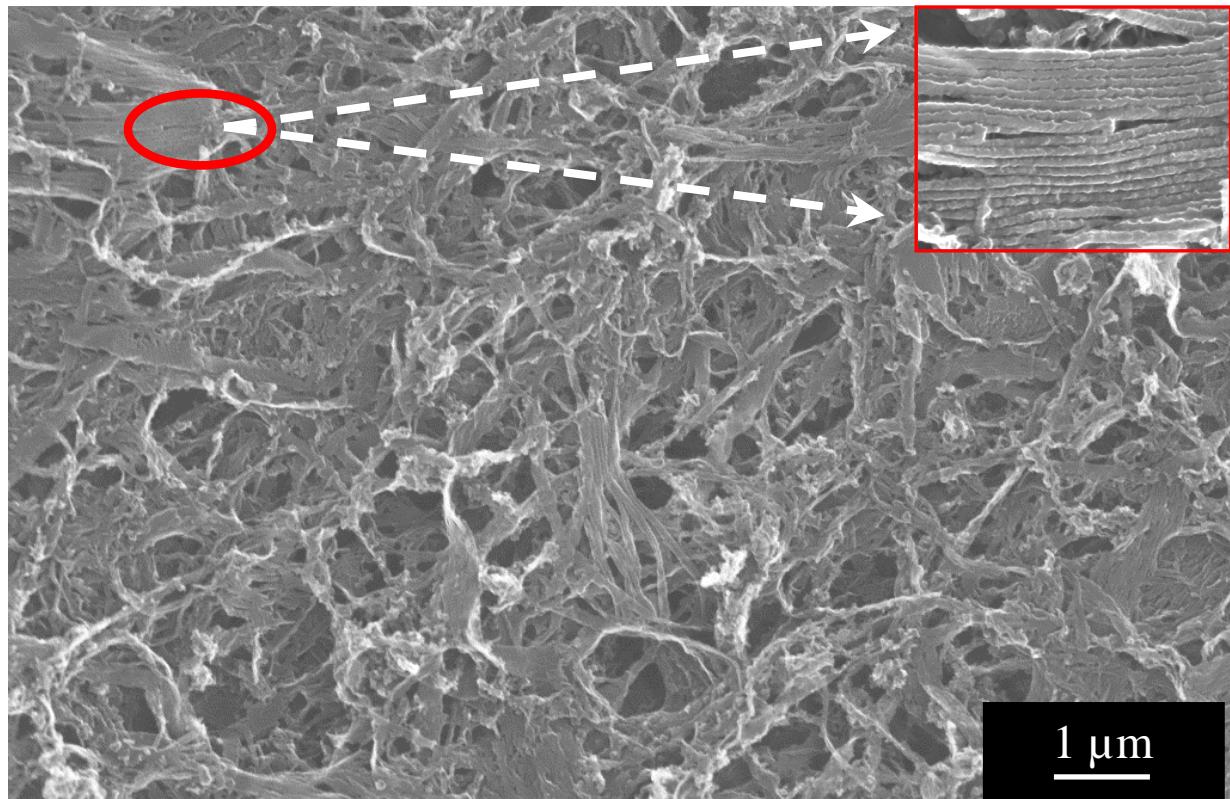


Figure S4. SEM image of doped polypyrrole synthesized using CTAB in aq. 1 M HCl/FeCl₃ system.

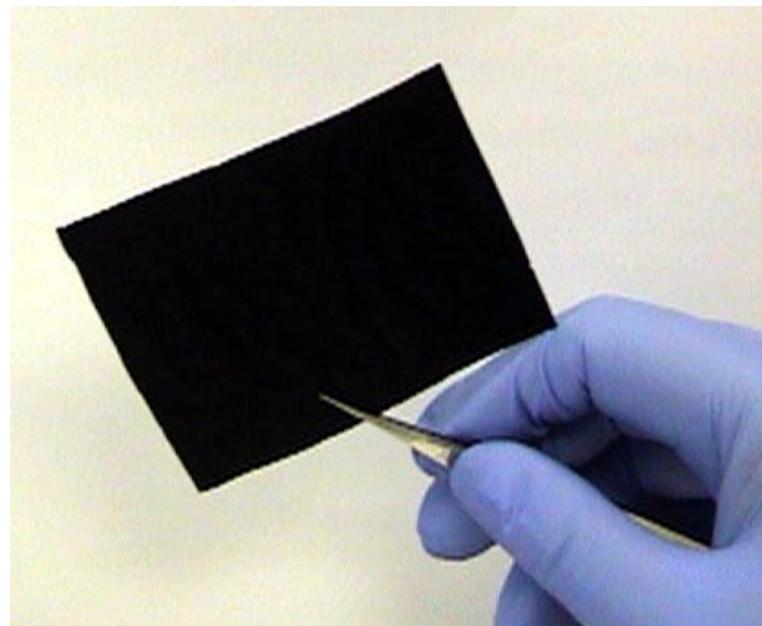


Figure S5. Digital image of free-standing polypyrrole nanofiber film.

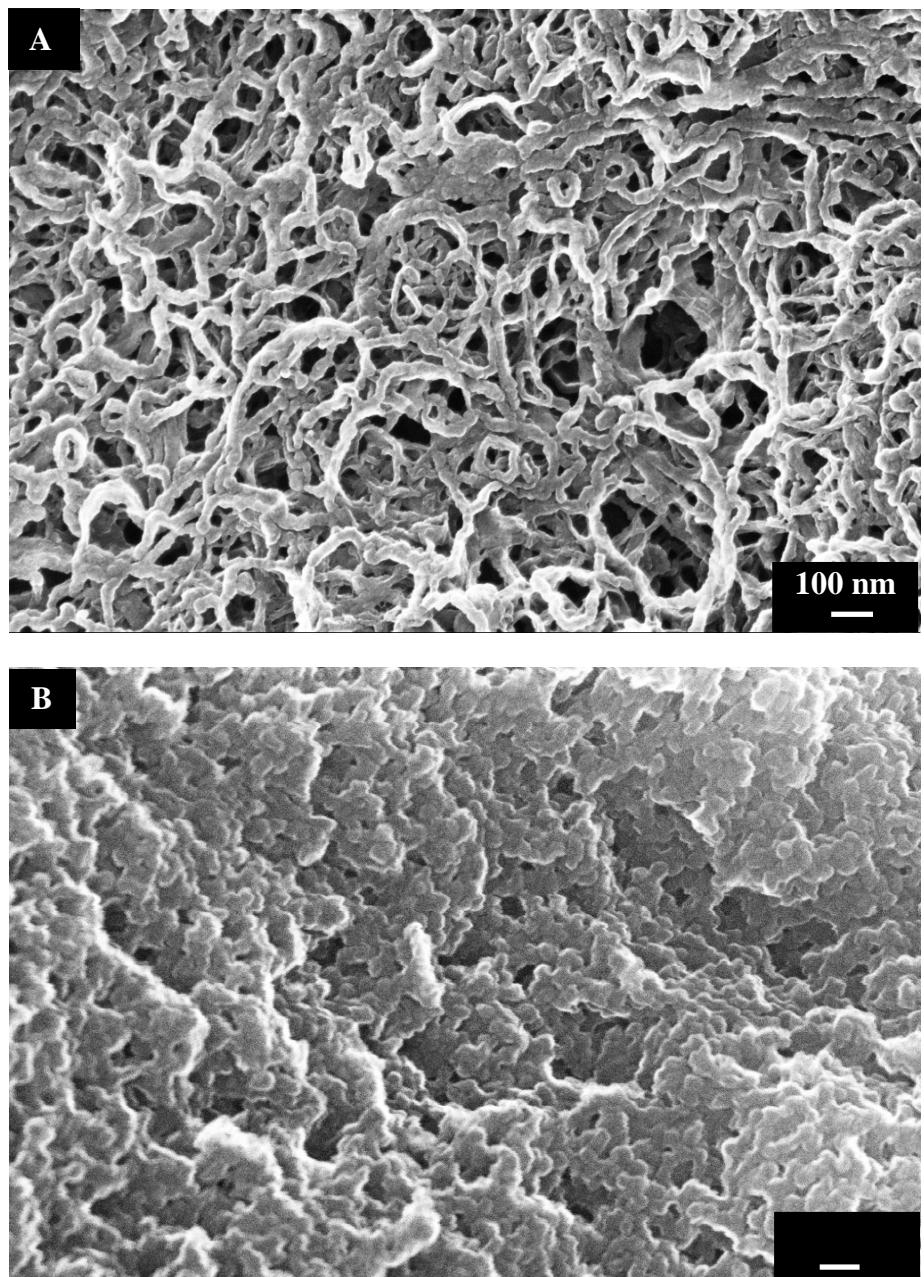


Figure S6. SEM images doped polypyrrole synthesized using using $(\text{NH}_4)_2\text{S}_2\text{O}_8$ oxidant at 0 °C in: (A) CTAB/aq. 2 M HCl. (B) CTAB/aq. 1 M H_2SO_4 .