Electronic Supplementary Data

**In situ** chemical oxidative polymerisation for ordered conducting polythiophene nanostructures in presence of dioctyl sodium sulfosuccinate

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Syntheses of PT-50, PT-75 and PT-100

Synthesis of PT-50 (Monomer: surfactant ratio [1: 1/50])

AOT (11 mg, 0.24 mmol) is dissolved in 20 ml chloroform. To that solution, thiopene (1mL, 1.05 g, 12.5 mmol) is added. Above solution is sonicated for 5 min. Ferric chloride (15 mmol, 2.43 g) is dispersed in 10 mL chloroform is added drop by drop to monomer solution. It is sonicated for 15 min and after that it is stirred using a magnetic stirrer for 3 h at 30°C. The resultant polymer is filtered and washed using water and then with acetone. The polymer is dried in vacuum oven at 60°C. Yield = 60% FT-IR (KBr, cm⁻¹) 1614, 1325, 1196, 1104, 1021, 784 and 686, Elemental comp. Calc., wt%: C = 54.12, S = 31.72, H = 3.35

Synthesis of PT-75 (Monomer: surfactant ratio [1:1/75])

AOT (7 mg, 0.16 mol) is dissolved in 20 ml chloroform. To that solution, thiopene (1mL, 12.5 mmol) is added. Above solution is sonicated for 5 min. Ferric chloride (15 mmol, 2.43g) is dispersed in 10 mL chloroform is added drop by drop to monomer solution. It is sonicated for 15 minutes and after that it is stirred using a magnetic stirrer for 3 h at 30 °C. The resultant polymer is filtered and washed using water and then with acetone. The polymer is dried in vacuum oven at 60 °C. FT-IR Yield = 52% (KBr, cm⁻¹) 1630, 1325, 1207, 1114, 1026, 778 and 691 Elemental comp.: Calc., wt %: C =54.87, S = 32.23, H = 3.44

Synthesis of PT-100 (Monomer: surfactant ratio [1:1/100])

AOT (5.5 mg, 0.125 mmol) is dissolved in 20 ml chloroform. To that solution, thiopene (1mL, 1.05 g, 12.5 mmol) is added and solution is sonicated for 5 min. Ferric chloride (15 mmol, 2.433g) is dispersed in 10 mL chloroform is added drop by drop to monomer solution. It is sonicated for 15 min and after that it is stirred using a magnetic stirrer for 3 h at 30 ° C. The resultant polymer is filtered and washed using water and then with acetone. The polymer is dried in vacuum oven at 60 ° C. Yield = 40; FT-IR (KBr, cm⁻¹) 1650, 1537, 1315, 1207, 1114, 1026, 778 and 691, Elemental comp.: Calc. wt %: C =54.90, S = 32.51, H =3.40.
Fig. S1 – (a) Photographs showing the polymerization of thiophene after adding oxidizing agent for initial 15 min in a sonicator (b) magnetic stirring for 3 h after sonication (inset shows the polythiophene powder dried).

Fig. S2 – Gaussian calculation of the peak area of the polythiophene samples.