Polymer defect engineering – conductive 2D organic platelets from precise thiophene-doped polyethylene

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Figure S1. $^1$H NMR spectra of TH20-m, TH20 and TH20-H
Figure S2. $^{13}$C NMR spectra of TH20-m, TH20 and TH20-H
Figure S3. $^1$H NMR spectra of TH38-m, TH38 and TH38-H
Figure S4. $^{13}$C NMR spectra of TH38-m, TH38 and TH38-H
Figure S5. Mass-spectrum of monomer TH20-m

Figure S6. GPC curves of unsaturated polymer TH20 (green), and polymer TH20-H (purple) after hydrogenation
Figure S7. DSC thermograms of unsaturated polymer TH20 and product after hydrogenation TH20-H.
Figure S8. Mass-spectrum of monomer TH38-m

Figure S9. GPC curves of unsaturated polymer TH20 (green), and polymer TH20-H (purple) after hydrogenation
Figure S10. Structure (A), TEM bright-field micrograph (B), conductivity (C) and DSC thermograms (D) of polymer TH38-H after electrochemical polymerization in solution (left) in crystal state (right)
**Figure S11.** Log I-Log V plot at low bias regime to prove Ohmic electrical conduction of the polymer TH38-H after electrochemical polymerization in crystal state with addition of EDOT.

**Figure S12.** (A) “Negative control” experiment. Polyphosphoester crystals after reaction with EDOT in the presence of FeCl$_3$ (black curve) do not reveal conductivity compare to thiophene crystals with conductive surface (red curve). (B) Chemical structure of polyphosphoester polymer.