

Supporting Information

Stepwise on-surface synthesis of thiophene-based polymeric ribbon by coupling reaction and carbon-fluorine bond cleavage

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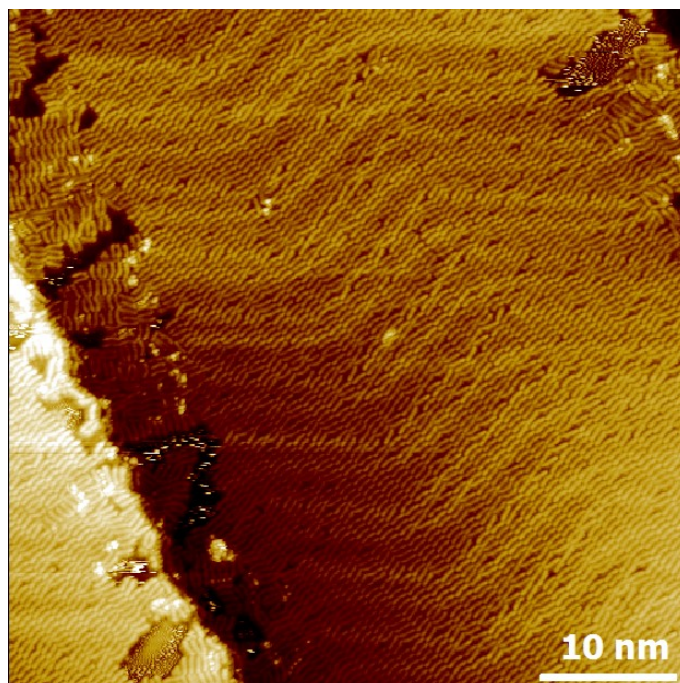


Figure S1. Large-scale STM image showing the self-assembly of FPT-Br precursor on Au(111) surface at room temperature. $V_b = -500$ mV, $I_t = 50$ pA.

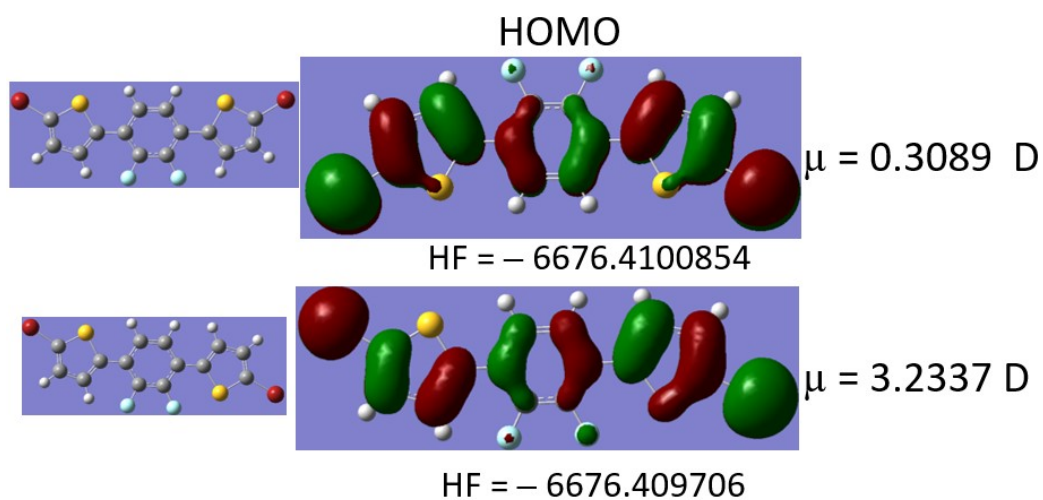


Figure S2. Optimized structure, HOMO, energy and dipole moment of FPT-Br with two conformations.

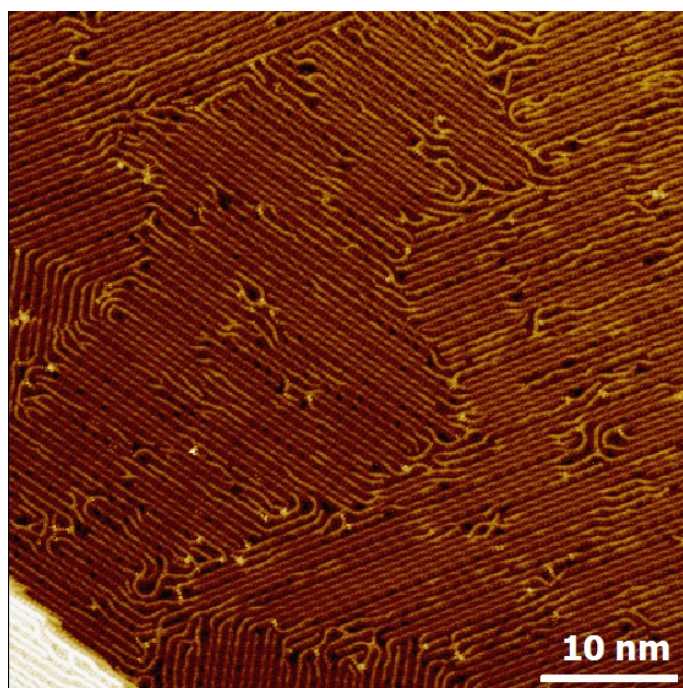


Figure S3. Large-scale STM image showing the formation of organometallic intermediate with C-Au-C bonds on the Au(111) surface after the above sample was annealing at 210 °C for 30 minutes . $V_b = 600 \text{ mV}$, $I_t = 400 \text{ pA}$.

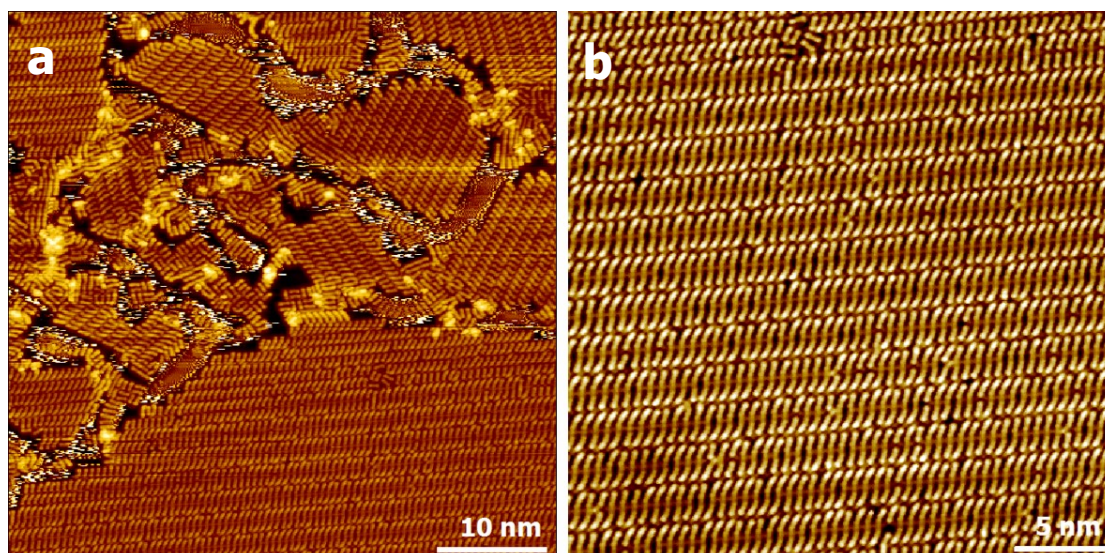


Figure S4. Large-scale and small-scale STM images of the organometallic intermediate after the sample was annealing at 40 °C for 2 hours. $V_b = -300$ mV, $I_t = 300$ pA.

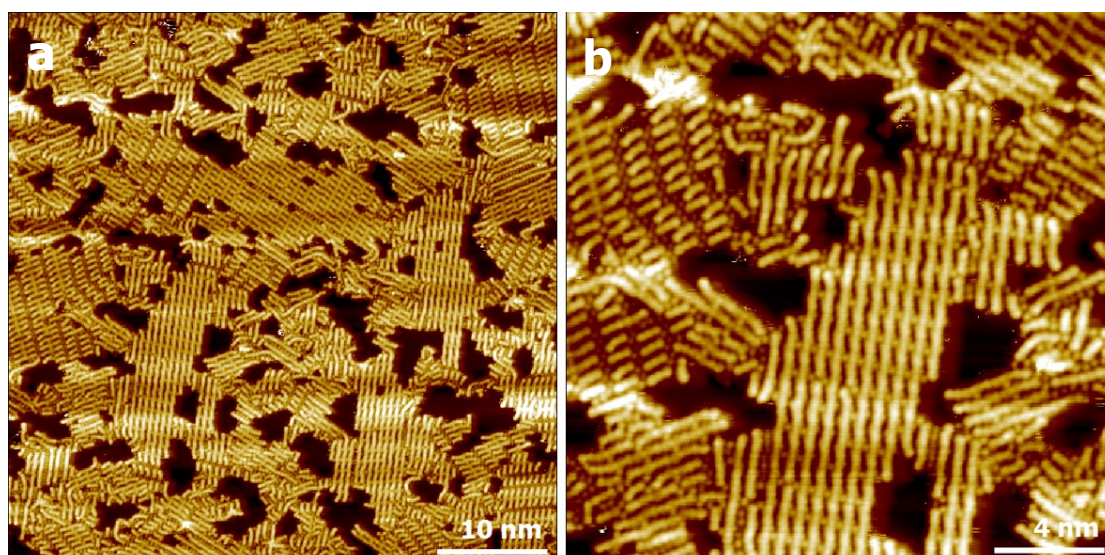


Figure S5. Large-scale and small-scale STM images of the organometallic intermediate after the sample was further annealing at 80 °C for 70 minutes and 130 °C for 90 minutes. $V_b = -600$ mV, $I_t = 300$ pA.

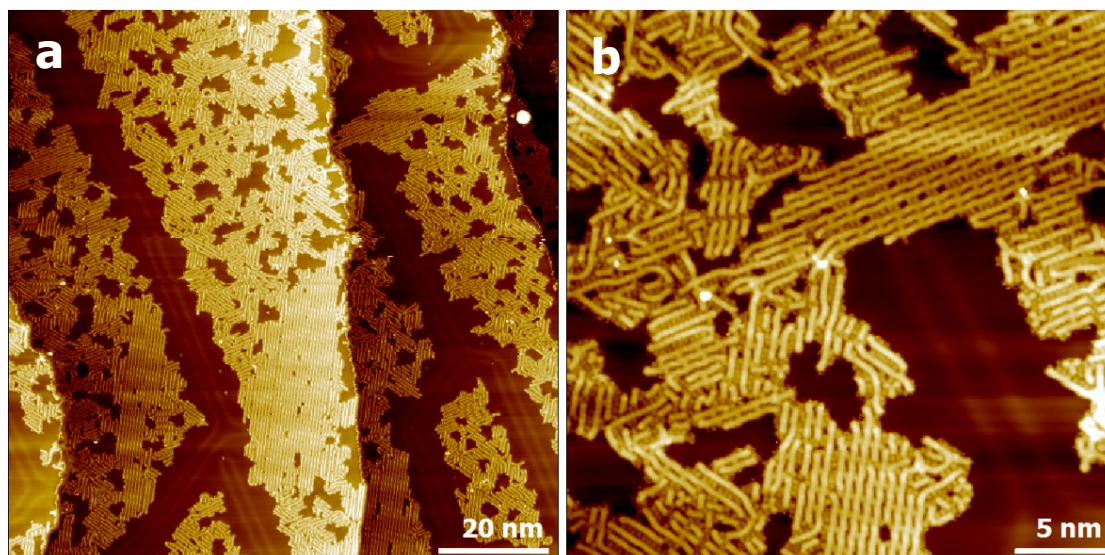


Figure S6. Large-scale and small-scale STM images of the organometallic intermediate after the sample was further annealing at 150 °C for 60 minutes. $V_b = -600$ mV, $I_t = 300$ pA.

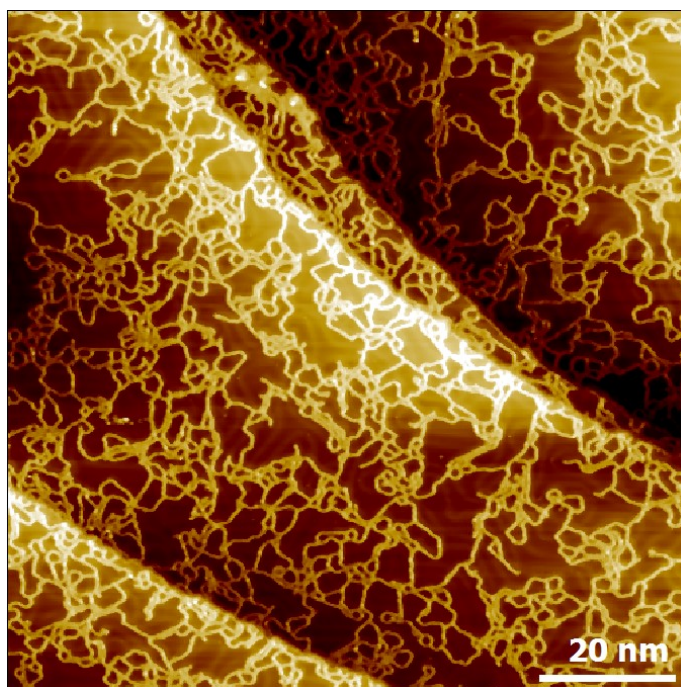


Figure S7. Large-scale STM image of the polymer after the sample was further annealing at 270 °C for 60 minutes. $V_b = -600$ mV, $I_t = 300$ pA.

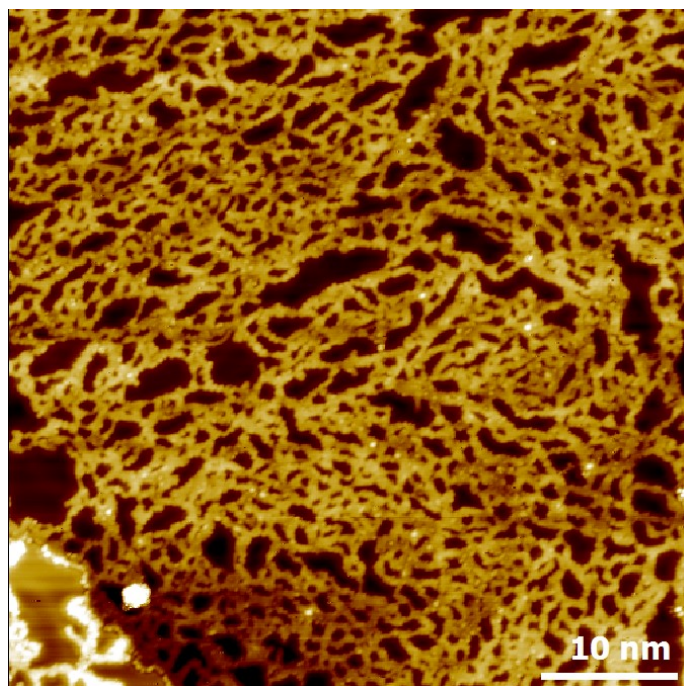


Figure S8. STM topographic image of Au(111) surface covered with polymeric ribbons after the sample was annealed at 390 °C for one hour. $V_b = -600$ mV, $I_t = 300$ pA.