

Supporting Information for

**On-surface Synthesis of Two Types of Cyano-substituted
Polyfluorene Derivatives via Ullman Coupling on Au(111)**

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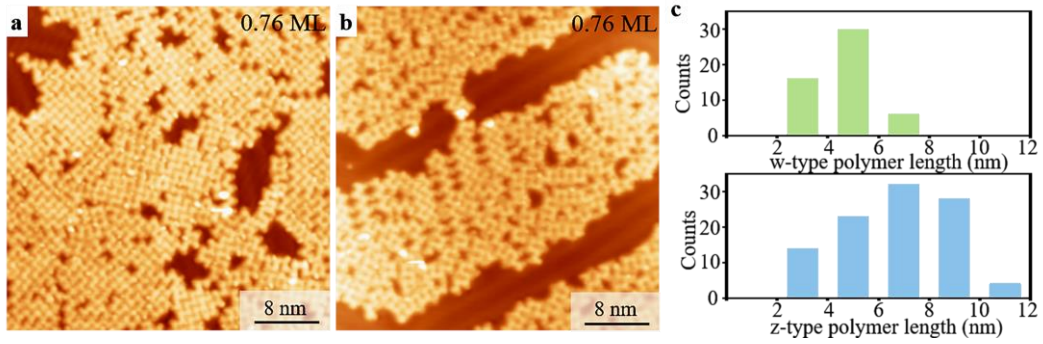


Fig. S1. (a, b) STM images of the sample with a coverage of 0.76 ML after annealing at 503 K. (c) Length statistics of two polymers. Tunneling parameters: (a) $U = 0.4$ V, $I = 30$ pA; (b) $U = 0.6$ V, $I = 20$ pA; (d) $U = 0.2$ V, $I = 60$ pA.

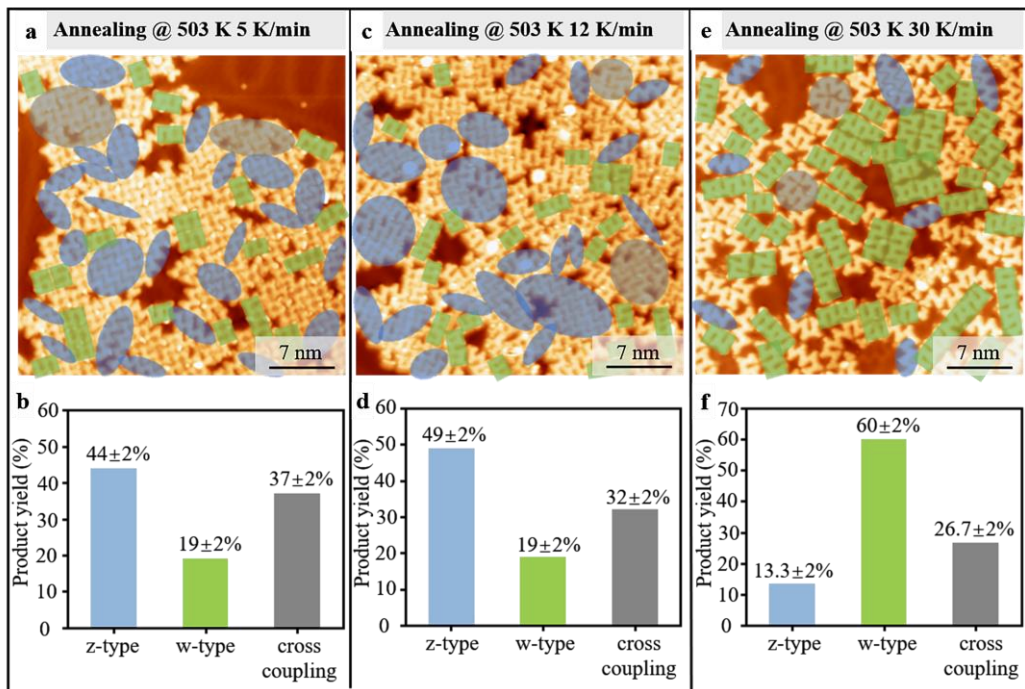


Fig. S2. (a, c, e) Experiments of high coverage sample controlled by changing annealing rate. The experimental conditions are marked on the top of corresponding STM images. The z-type, w-type and cross coupling polymers are marked by blue, green and gray shadows, respectively. (b, d, f) Statistics of polymer yield with corresponding experimental conditions. The blue, green and gray bars show the yields of z-type, w-type and cross coupling polymers. Tunneling parameters: (a) $U = 0.4$ V, $I = 40$ pA; (c) $U = 0.3$ V, $I = 30$ pA; (e) $U = 0.3$ V, $I = 40$ pA.

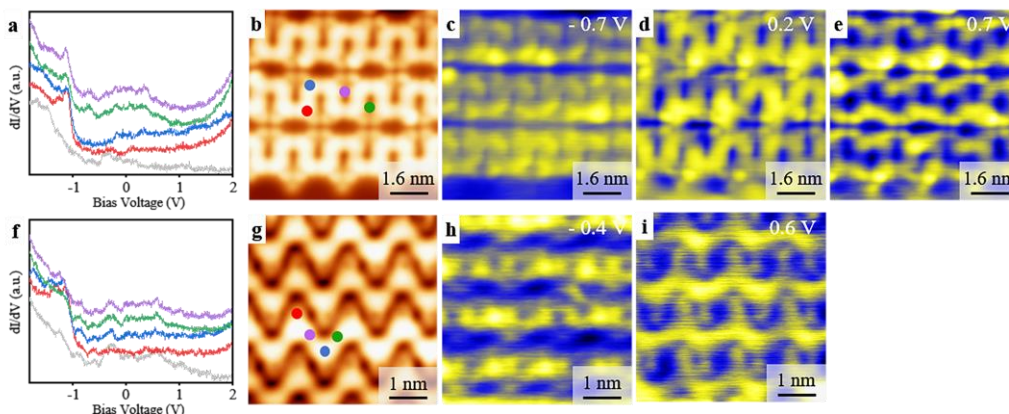


Fig. S3. (a, f) Differential conductance (dI/dV) spectra taken at different sites of the polymers in panels (b) and (g). (b, g) Close-up STM images of two polymers. Colored points mark the positions where spectra in panels (b) and (g) were taken. (c-e) Constant current dI/dV maps of the w-type polymer in panel (b) taken at $V = -0.7$ V, $V = 0.2$ V and $V = 0.7$ V, respectively. (h, i) Constant current dI/dV maps of the z-type polymer in panel (g) taken at $V = -0.4$ V and $V = 0.6$ V, respectively. Tunneling parameters: (b) $U = 0.2$ V, $I = 120$ pA; (g) $U = 0.2$ V, $I = 100$ pA.

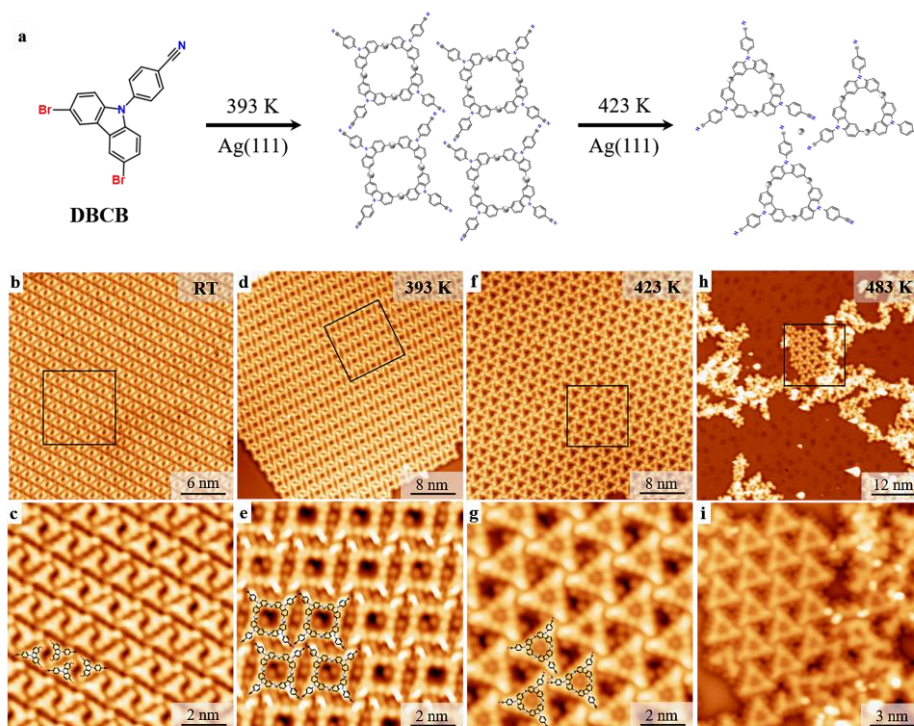


Fig. S4. (a) DBCB monomer forming metal organic frameworks by a two-step annealing sequence on Ag(111). (b, c) Large-scale (b) and close-up (c) STM images of DBCB self-assembled structures with Ag(111) surface maintained at room temperature. (d, e) Large-scale (d) and close-up (e) STM images of quadrilateral metal organic frameworks obtained after annealing at 393 K. (f, g) Large-scale (f) and close-up (g) STM images of triangular metal organic frameworks obtained after annealing at 423 K. (h, i) Large-scale (h) and close-up (i) STM images after annealing at 483 K. Tunneling parameters: (b) $U = 0.4$ V, $I = 30$ pA; (c) $U = 0.2$ V, $I = 150$ pA; (d, f) $U = 0.3$ V, $I = 40$ pA; (e, g) $U = 0.2$ V, $I = 200$ pA; (h, i) $U = 0.4$ V, $I = 20$ pA.