Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Electrochemical polymerized and assemblied cyclopalladated bi-thiophene imine for catalyzing coupling reaction: A modern strategy to enchancing catalytic activity

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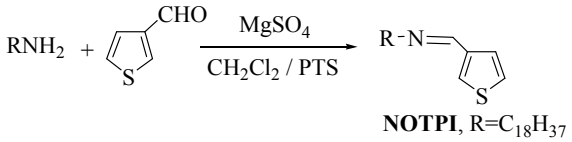
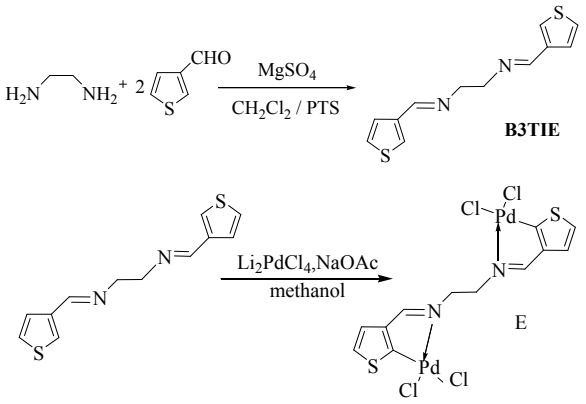




Scheme S1 Synthesis of **NOTPI**, **B3TIE and CPDTDI（E）**

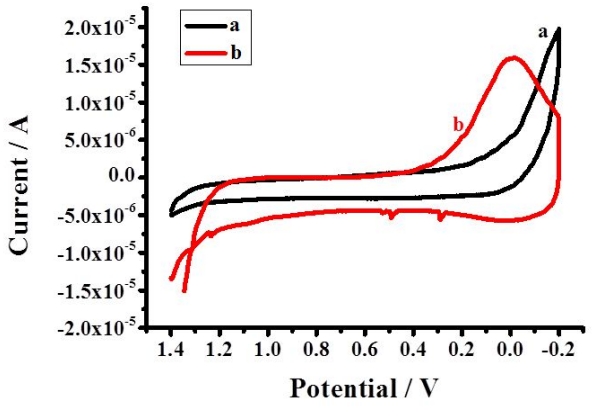


Figure S1 Cyclic voltammograms of (a) hydrophilic ITO and (b) **B3TIE** monolayer. (SP=12mN/m)

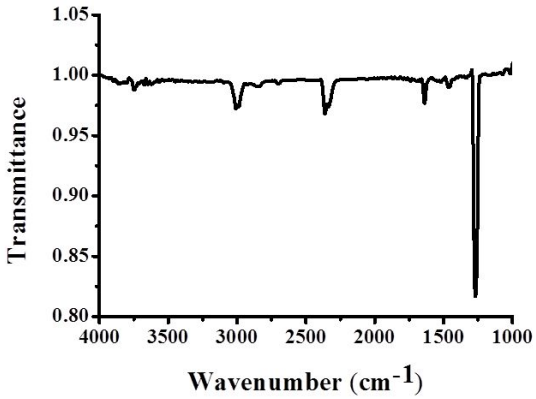


Figure S2 IR spectrum of two-layer LB films of **B3TIE** transferred onto CaF_2. (SP = 12 mN/m)

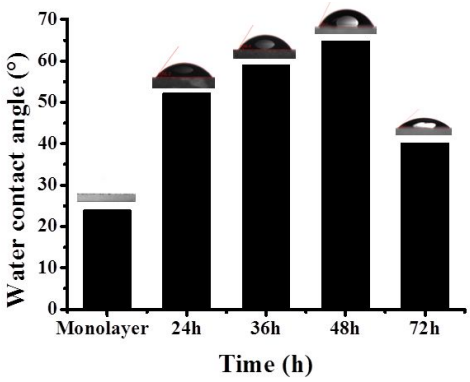


Figure S3 WCA histogram of different self-assembly time of **SABM**

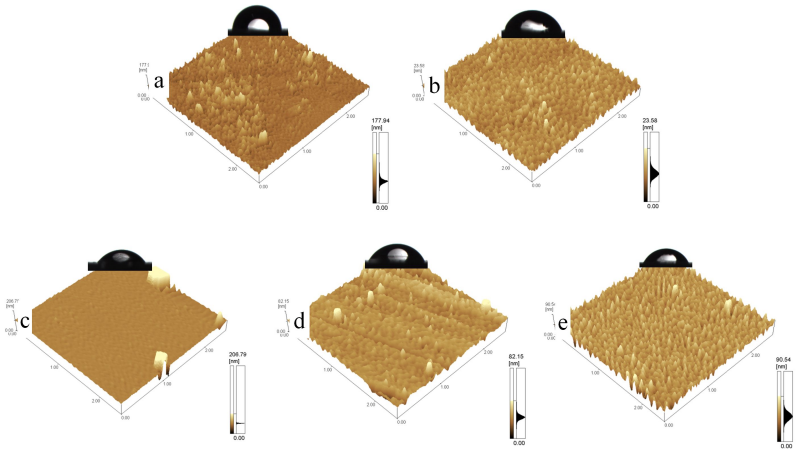


Figure S4 AFM images of **SABM** on silicon at (a) 8 mN/m, (b) 10 mN/m, (c) 12 mN/m, (d) 14 mN/m and (e) 16 mN/m.

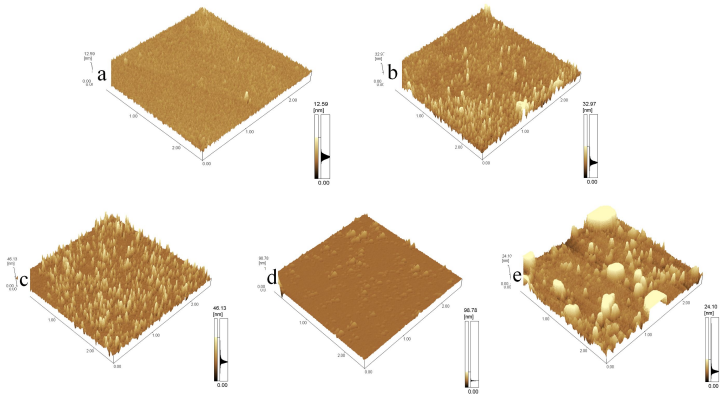


Figure S5 AFM images of **SABM** at different time (a, 0 h; a, 24h; c, 36h; d, 48h; e, 72h)**.**

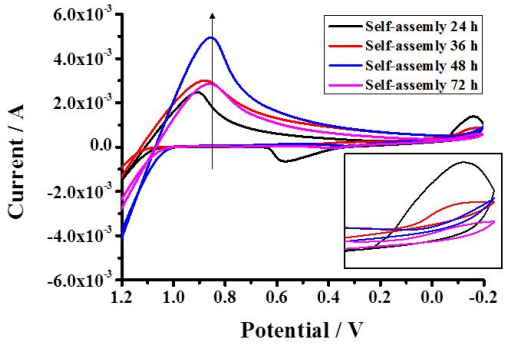


Figure S6 Cyclic voltammograms of different assembly time of **SABM** on ITO electrode.

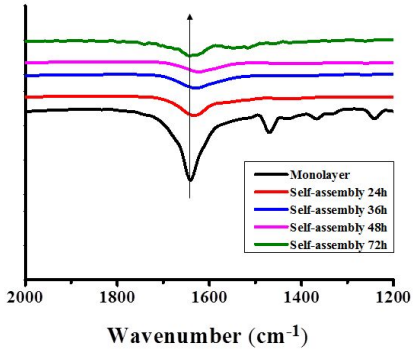


Figure S7 Infrared spectra of different assembly time of **SABM** on CaF_2 with Li_2PdCl_4

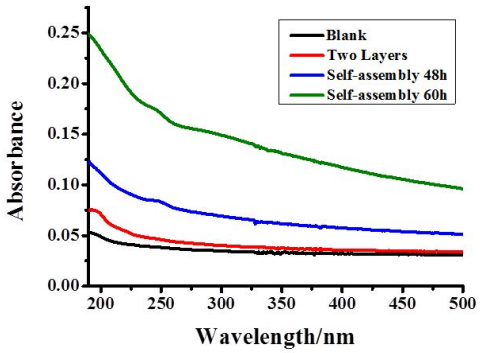


Figure S8 UV spectra of **SABM** for 48h and 60h.

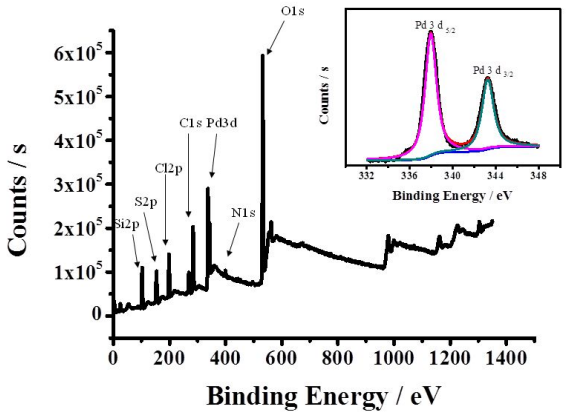


Figure S9 XPS spectra of **SABM** for 48h

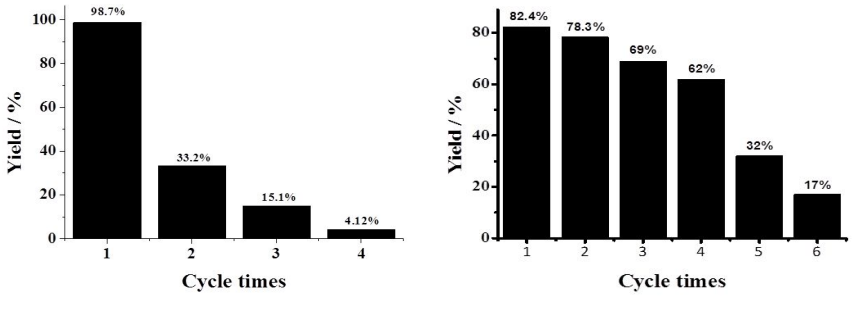


Figure S10 Yields obtained by **SABM** with (**a**) and without stirring (**b**)

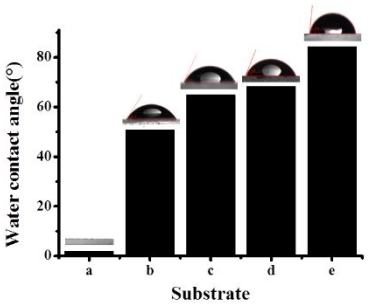
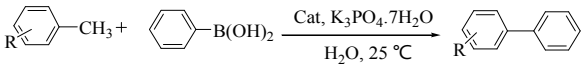


Figure S11 Water contact angles of a: hydrophilic silicon, b: **B3TIE** monolayer, c: **ECP B3TIE** monolayer, d: **SABM** and e: **ECP-SABM**.

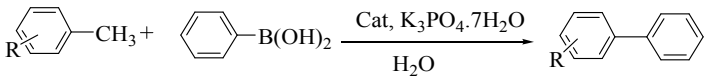
Table S1 Effect of **SABM** deposited at different SP for Suzuki coupling reaction



Entry	Surface pressure (mN/m)	Isolated yield (%)
1	8	26.7
2	10	23.8
3	12	57.0
4	14	11.7
5	16	25.2

Reaction conditions: $PhB(OH)_2$ (0.30 mmol), 4-bromotoluene (0.25 mmol), Base (0.30 mmol), H_2O (10 mL), TBAB (0.3 mmol). Isolated yield, based on the product. Reaction time 24 h.

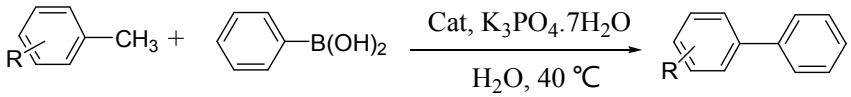
Table S2 Selection of condition for Suzuki coupling reaction

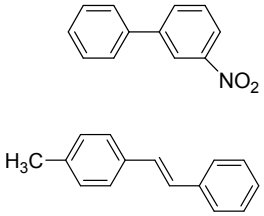
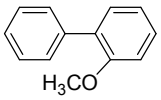
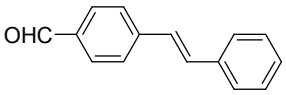
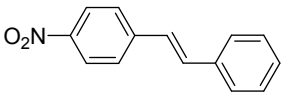
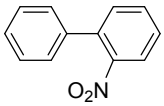
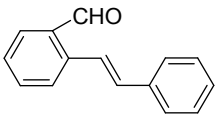
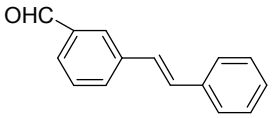
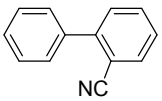
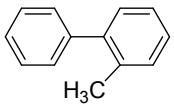


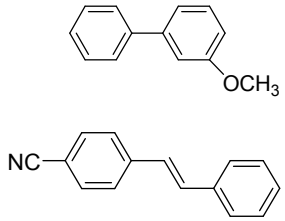
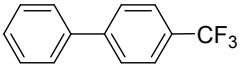
Entry	Reaction time (h)	Self-assembly time (h)	T (℃)	Isolated yield (%)	TON
1	24	24	25	57	4563
2	36	48	40	50.4	4114
3	24	48	40	73.6	6007
4	48	48	50	42.2	3444
5	48	24	40	68	5550
6	48	48	40	82.4	6726
7[a]	48	48	40	76.4	5840

Reaction conditions: $PhB(OH)_2$ (0.30 mmol), 4-bromotoluene (0.25 mmol), Base (0.30 mmol), H_2O (8 mL), TBAB (0.3 mmol). Deposition SP: 12mN/m; a: **SAMB** deposited at 16 mN/m.

Table S3 Substrate expansion for Suzuki coupling reaction



Entry	ArX	Product	Isolated yield (%)
1	*p*-$CH_3C_6H_4Br$		82.4
2	*p*-$CH_3OC_6H_4Br$		85.6
3	*p*-$CF_3C_6H_4Br$		88
4	*p*-$CHOC_6H_4Br$		62.4
5	*p*-$NO_2C_6H_4Br$		81.2
6	*o*-$CH_3C_6H_4Br$		82.8
7	*o*-$CHOC_6H_4Br$		87.8
8	*m*-CHO-C_6H_4Br		62.4
9	*o*-$COOCH_3$-C_6H_4Br		99
10	*m*-$CH_3C_6H_4Br$		86.4

11	*p*-CNC_6H_4Br		81.7
12	*m*-CNC_6H_4Br		62.8
13	*o*-CNC_6H_4Br		13.9

Reaction conditions: $PhB(OH)_2$ (0.30 mmol), ArBr (0.25 mmol), Base (0.30 mmol), H_2O (8 mL), TBAB (0.3 mmol), 40℃ for 48h.

The reaction of substrates with a strongly electron repulsive group, such as *p or m*-substituted of bromobenzene with styrene gave good yields (Table S3, entries 1-2, 10). Good yields were also obtained with strongly electron withdrawing group of *p or m, o*-substituted of bromobenzene (Table S3, entries 3, 5-7, 9-11). The yields were moderate with withdrawing or repulsive group in *p* or *m*-position (Table S3, entries 4, 8, 12). In the reaction system, the yield of 2-bromo-benzonitrile was only 13% because of steric effect (Table S3, entries 13).

Table S4 Content of palladium after recycling with **SABM**

Entry	0	1	2	3	4
Substrate Pd count ($\times 10^{-7}$mmol)	7.09	6.09	5.31	4.61	3.68