Electronic Supplementary Information for

Two-dimensional self-assembly and co-assembly of two tetracarboxylic acid derivatives investigated by STM

Xuan Peng,[a, d, ξ] Linlin Gan,[a, c, ξ] Wenchao Zhai,[d] Xiaoling Chen,[d] Ke Deng,[*a] Wubiao Duan,[*c] Wei Li,[*d] Qingdao Zeng[*a, b]

a. CAS key Laboratory of Standardization and Measurement for Nanotechnology, CAS Center for Excellence in Nanoscience, National Center for Nanoscience and Technology (NCNST), Beijing 100190, China.

b. Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, Beijing 100049, China.

c. Department of Chemistry, School of Science, Beijing Jiaotong University, Beijing 100044, China.

d. School of Science, Nanchang Institute of Technology, Nanchang 330099, China.

*Corresponding author E-mail: kdeng@nanoctr.cn; liweidting@nit.edu.cn; wbduan@bjtu.edu.cn; zengqd@nanoctr.cn.

[ξ] Xuan Peng and Linlin Gan contributed to this work equally.

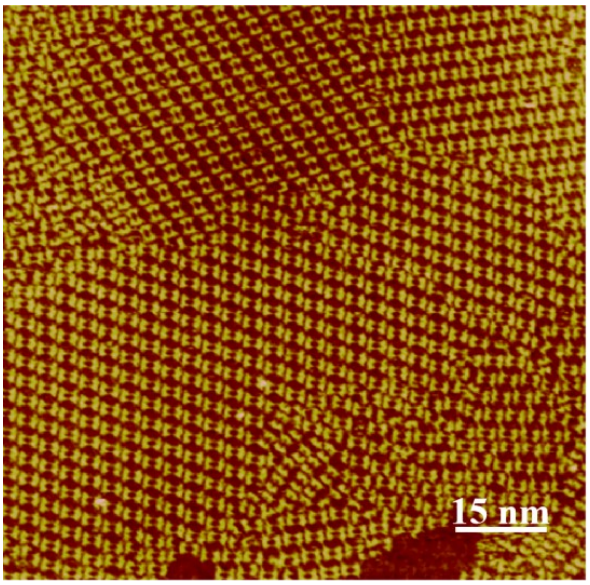

Fig. S1 Large-scale STM image of H_4BDETP's self-assembled nanostructure at the 1-heptanoic acid/HOPG interface with the tunneling conditions of I_{set} = 216.7 pA, V_{bias} = 707.4 mV.

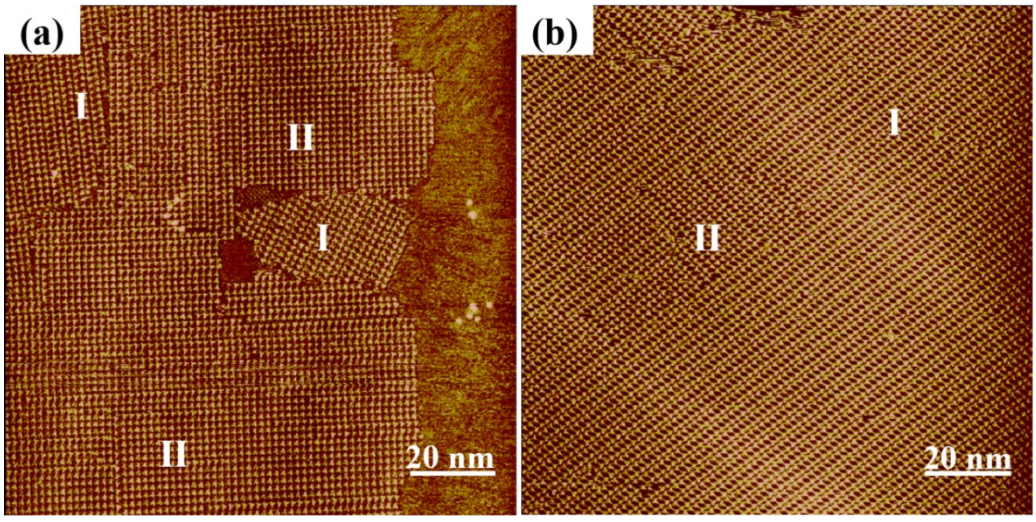

Fig. S2 (a), (b) Large-scale STM images of H_4BTB's two self-assembled nanostructure (lamellar nanostructure in domain I and tetragonal nanostructure in domain II) at the 1-heptanoic acid/HOPG interface, both the tunneling conditions were: I_{set} = 363.2 pA, V_{bias} = 668.0 mV.

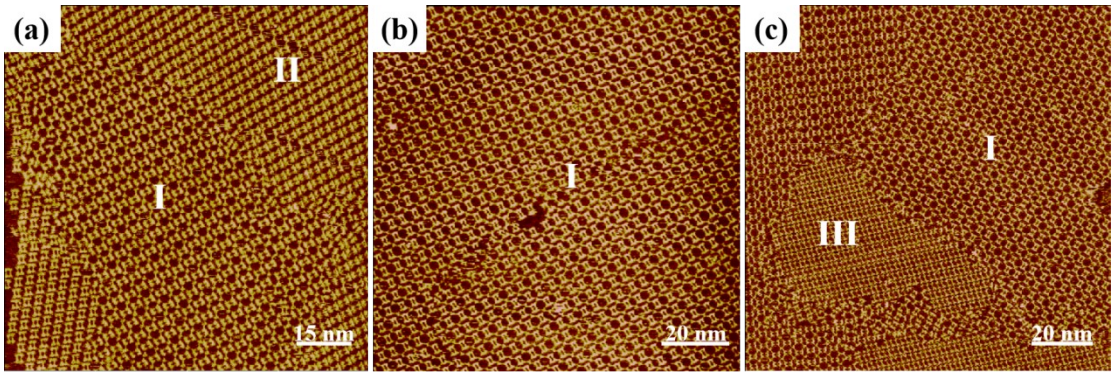

Fig. S3 Large-scale STM images of two-component system prepared by dropping H_4BTB to pre-assembled H_4BDETP with different molar ratios: (a) H_4BDETP: H_4BTB > 2:1, I_{set} = 219.7 pA , V_{bias} = 655.2 mV; (b) H_4BDETP: H_4BTB = 2:1, I_{set} = 265.5 pA, V_{bias} = 754.4 mV; (c) H_4BDETP: H_4BTB < 2:1, I_{set} = 174.0 pA, V_{bias} = 551.5 mV. (Domain I: H_4BDETP/H_4BTB co-assembly structure. Domain II: self-assembly structure of H_4BDETP. Domain III: self-assembly structure of H_4BTB)

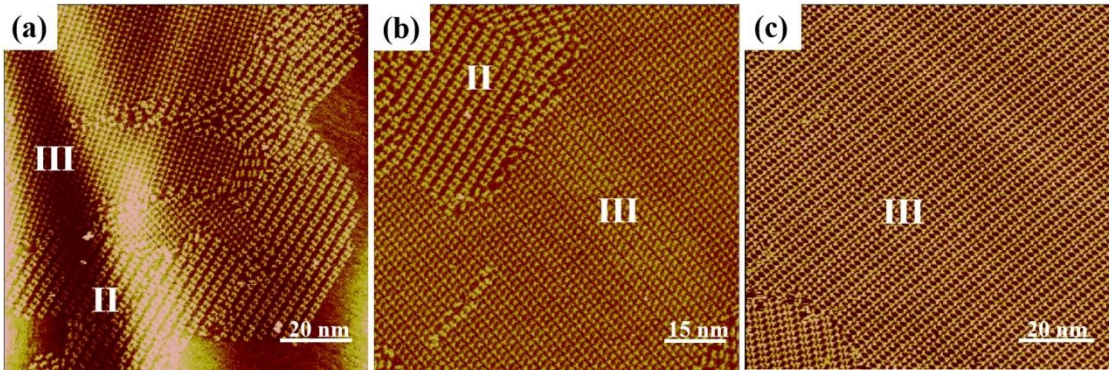

Fig. S4 Large-scale STM images of assembled structures prepared by dropping H_4BDETP to pre-assembled H_4BTB with different molar ratios: (a) H_4BDETP: H_4BTB > 2:1, I_{set} =296.0 pA, V_{bias} = 578.9 mV; (b) H_4BDETP: H_4BTB = 2:1, I_{set} = 296.0 pA, V_{bias} = 578.9 mV; (c) H_4BDETP: H_4BTB < 2:1, I_{set} = 299.8 pA, V_{bias} = 699.8 mV. (Domain II: self-assembly structure of H_4BDETP. Domain III: self-assembly structure of H_4BTB)

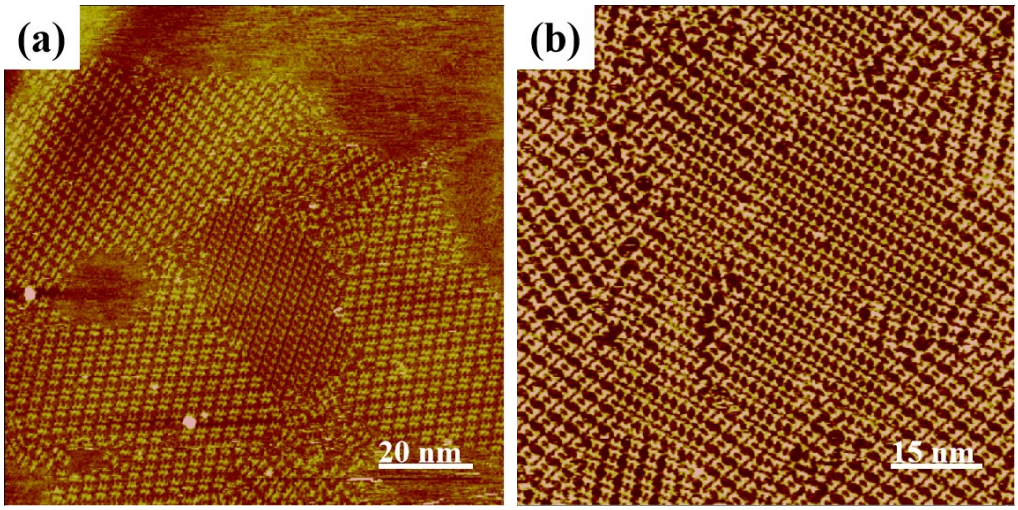

Fig. S5 Large-scale STM images of two-component system prepared by pre-mixing H_4BTB and H_4BDETP solution： (a) I_{set} = 241.1 pA, V_{bias} = 846.3 mV , (b) I_{set} = 335.7 pA, V_{bias} = 660.4 mV . The concentration of H_4BTB increased from (a) to (b).