

Electronic supplementary Information

Controlled Self-Assembly and Photovoltaic Characteristics of Porphyrin Derivatives on Silicon Surface at Solid-Liquid Interfaces

Jinhua Cai,^{*a,b} Haihui Chen,^a Jiangen Huang,^a Jingxia Wang,^b Dongliang Tian,^c Huanli Dong^b and Lei Jiang^{*b}

^aCollege of Chemistry & Chemical Engineering, Jinggangshan University, Jian, Jiangxi Province 343009, P. R. China

^bBeijing National Laboratory for Molecular Sciences (BNLMS), Key Laboratory of Organic Solids, Key Laboratory of Green Printing, Institute of Chemistry, Chinese Academy of Sciences, Beijing 100190, P. R. China

^cKey Laboratory of Bio-Inspired Smart Interfacial Science and Technology of Ministry of Education, School of Chemistry and Environment, Beihang University, Beijing 100191, P. R. China

1. Synthesis of meso-tetraphenylporphyrin Zinc (ZnTPP) and meso-tetraphenylporphyrin Copper (CuTPP)

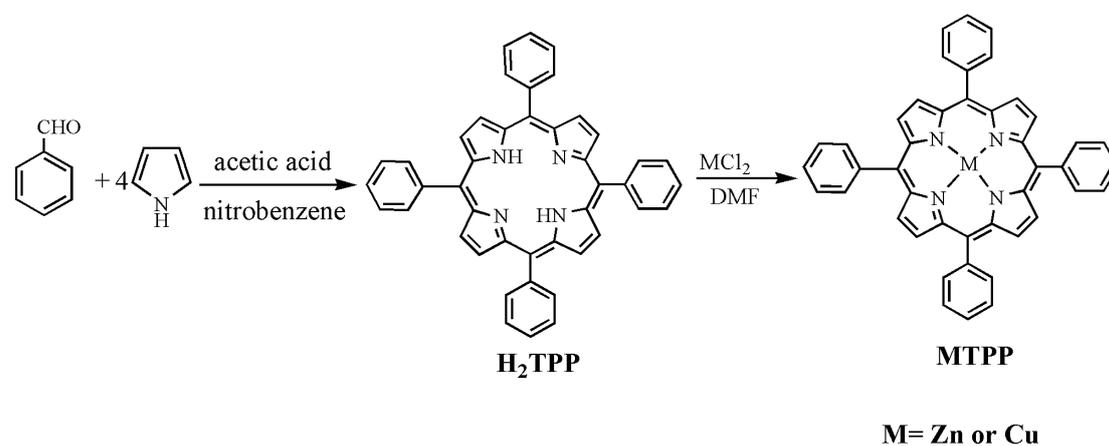


Figure S1. Synthesis route of ZnTPP and CuTPP

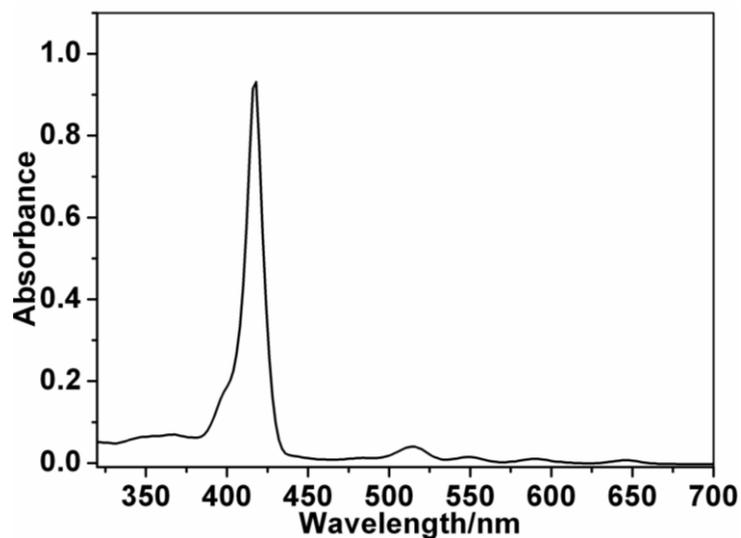


Figure S2. UV-visible absorption spectra of TPP in CHCl_3

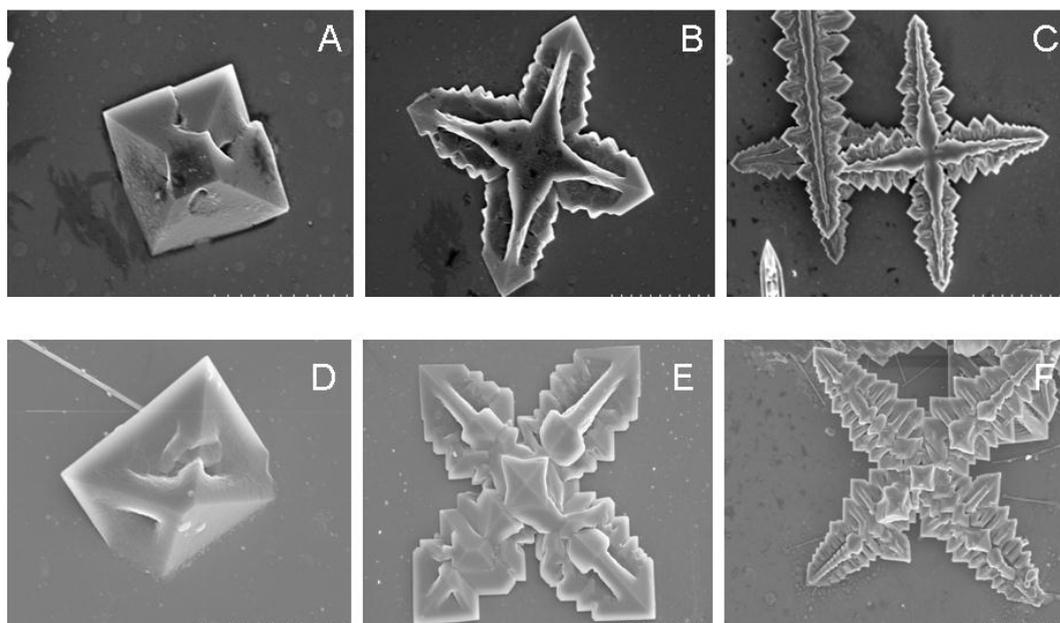


Figure S3. (A-C) SEM images of the four-leaf clover-shaped structures of ZnTPP sampled at various times during growth: 30 seconds (A), 5 minutes (B), 10 minutes (C). The size, size distribution, and morphology seen after 10 minutes is not significantly changed. (D-F) SEM images of the four-leaf clover-shaped structures of CuTPP sampled at various times during growth: 30 seconds (D), 5 minutes (E), 10 minutes (F). The size, size distribution, and morphology seen after 10 minutes is not significantly changed.

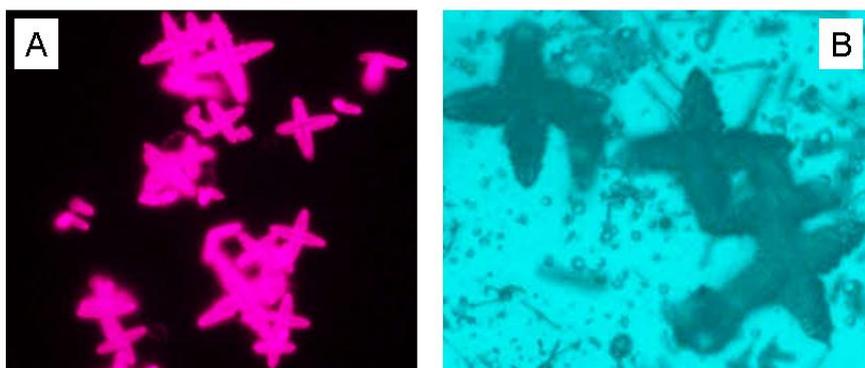


Figure S4. Optical images of four-leaf clover-shaped nanostructures of ZnTPP (a) and CuTPP (b)

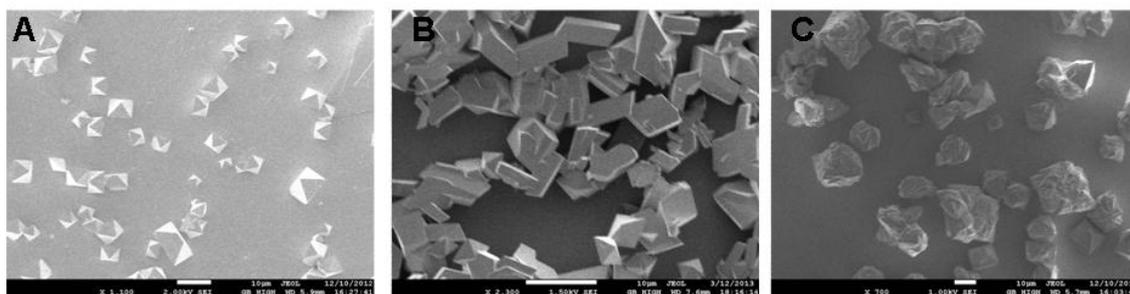


Figure S5. SEM images of the ZnTPP prepared in CHCl_3 / *i*-PrOH (v/v 1:1) at the temperature of (a) 20 °C, (b) 40 °C, (c) 60 °C

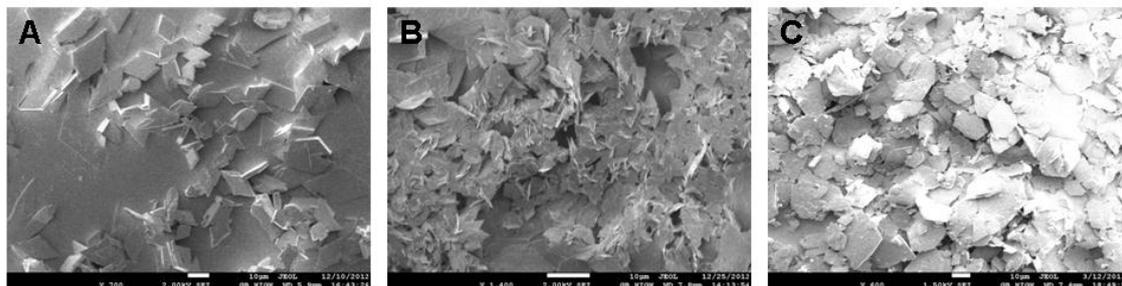


Figure S6. SEM images of the ZnTPP prepared in CHCl_3 / cyclohexane (v/v 1:1) at the temperature of (a) 20 °C, (b) 40 °C, (c) 60 °C

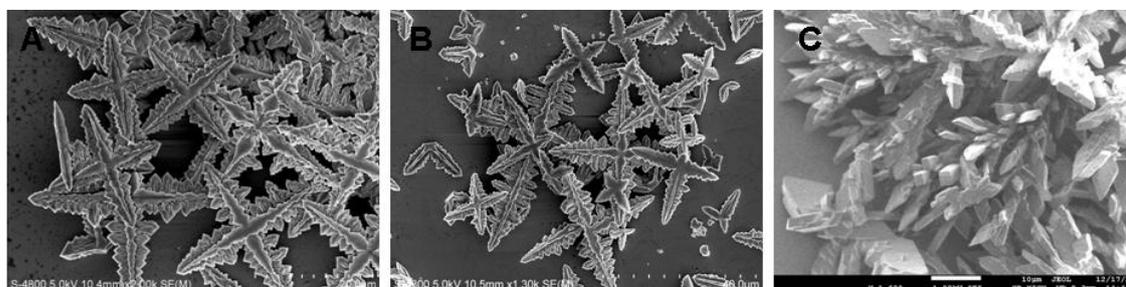


Figure S7. SEM images of the ZnTPP prepared in CHCl_3 / MeOH (v/v 1:1) at the temperature of (a) 20 °C, (b) 40 °C, (c) 60 °C

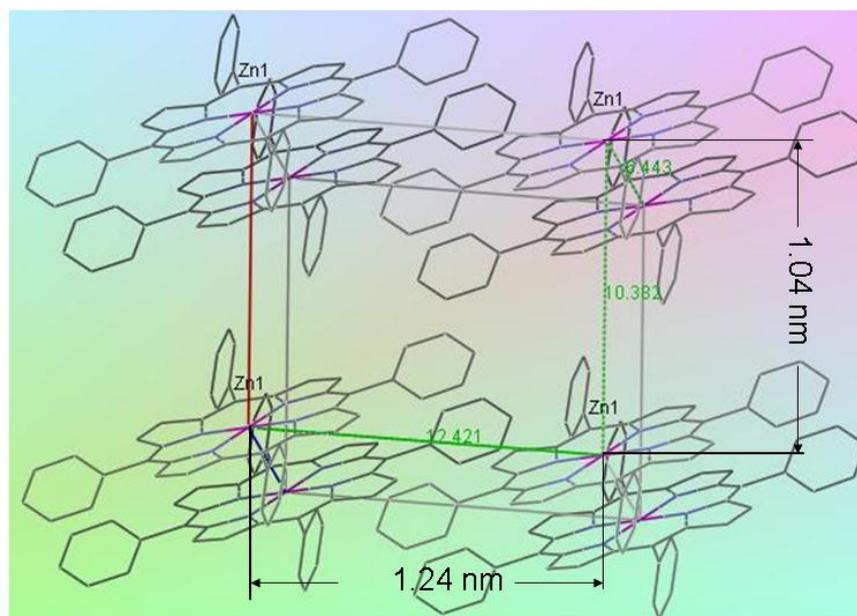


Figure S8 . Schematic representation of the unit cell in the aggregate of ZnTPP (CCDC, Refcode ZZZTAY02)

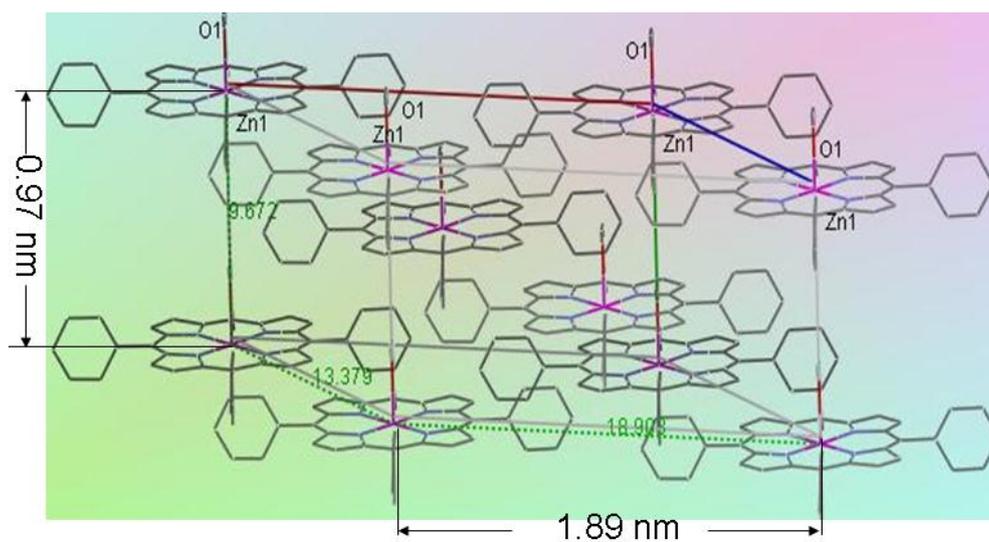


Figure S9 . Schematic representation of the unit cell in the aggregate of ZnTPP (CCDC, Refcode ZNTPOR03)

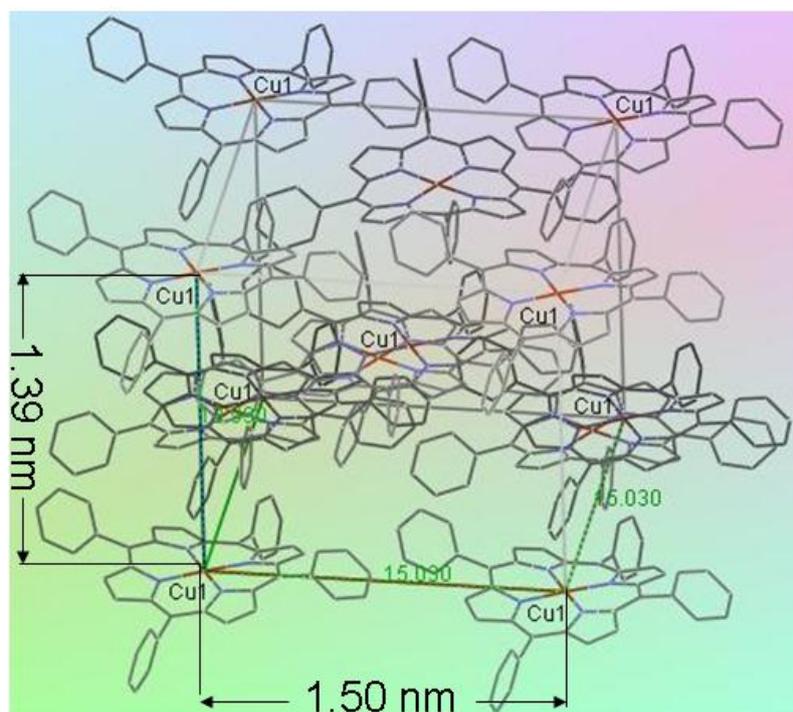


Figure S10. Schematic representation of the unit cell in the aggregate of CuTPP (CCDC Refcode: CUTPOR)

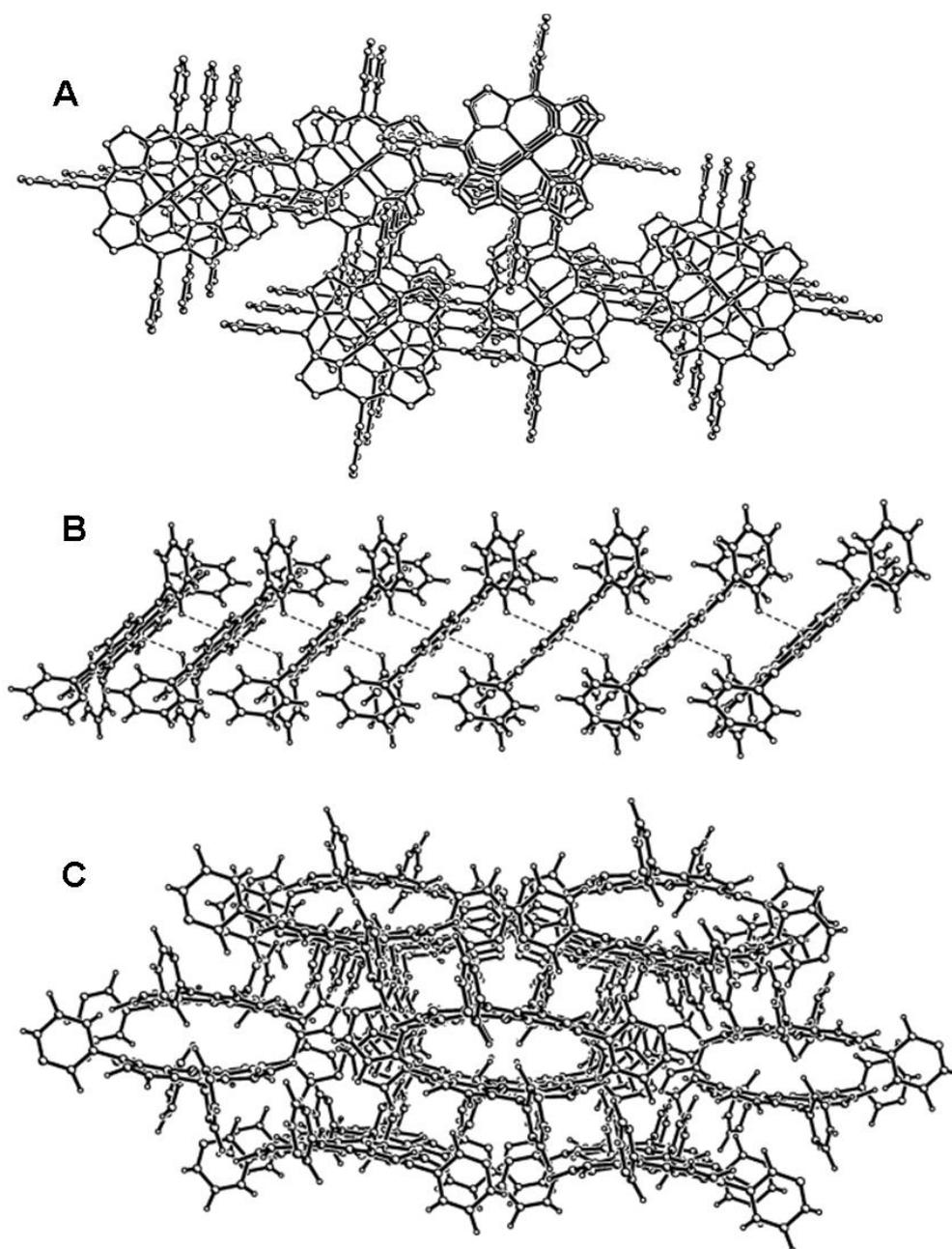


Figure S11. Packing-diagram representation of the single crystal structure of (A) CCDC, Refcode ZZZTAY02, (B) CCDC, Refcode ZNTPOR03, (C) CCDC, Refcode CUTPOR showing π - π interaction between adjacent porphyrin layers

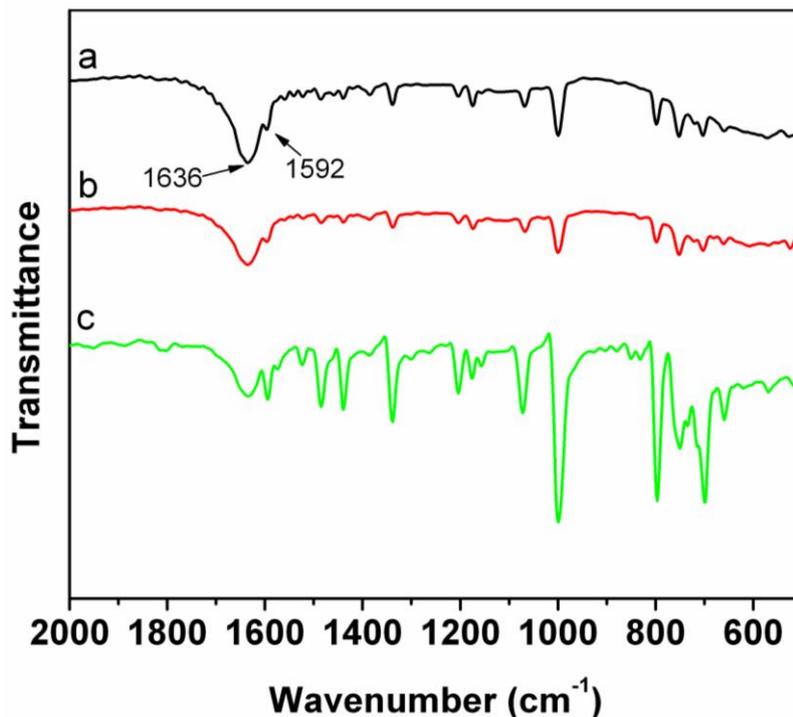


Figure S12. IR spectra of aggregates of compound ZnTPP with four-leaf clover-shaped structures formed in CHCl₃/ MeOH (v/v 1:1) (a); Octahedrons formed in CHCl₃/ i-PrOH (v/v 1:1) (b); Nanoslices formed in CHCl₃/ cyclohexane (v/v 1:1) (c) in the region 400-4000 cm⁻¹ with 2 cm⁻¹ resolution.

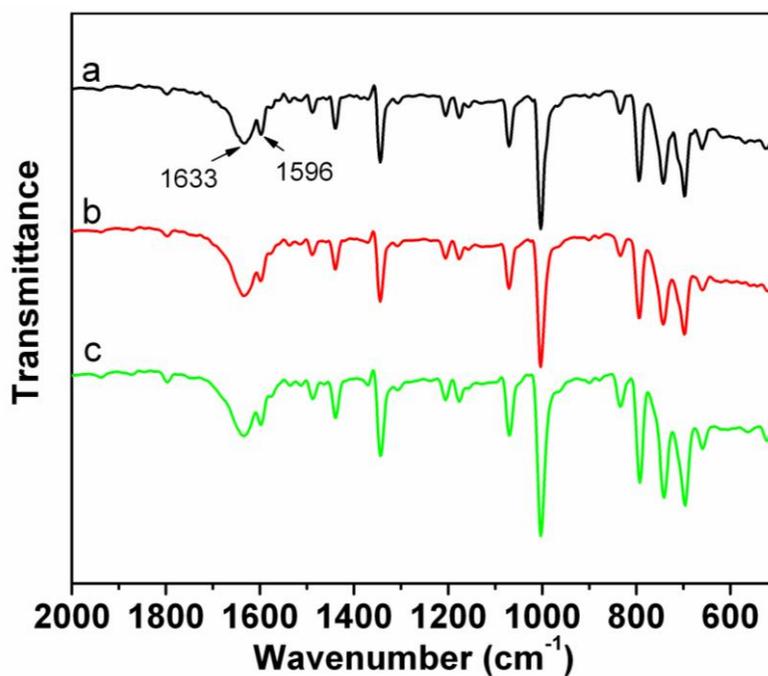


Figure S13. IR spectra of aggregates of compound CuTPP with four-leaf clover-shaped structures formed in CHCl₃/ MeOH (v/v 1:1) (a); Octahedrons formed in CHCl₃/ i-PrOH (v/v 1:1) (b); Nanorods formed in CHCl₃/ cyclohexane (v/v 1:1) (c) in the region 400-4000 cm⁻¹ with 2 cm⁻¹ resolution.