Supplementary Information for

Coassembly System of Aromatic Donor and Acceptor: Charge Transfer, Electric Bistability, and Photoconductivity

Jia Luo,[a] Linfeng Chen,[a] Jie-Yu Wang,[b] Ting Lei,[b] Li-Yi Li, [b] Jian Pei, *,[b] and Yanlin Song*,[a]

Beijing National Laboratory for Molecular Sciences (BNLMS), Key Laboratory of Organic Solid, Laboratory of New Materials, Institute of Chemistry, The Chinese Academy of Sciences, Beijing, 100190 (China); ylsong@iccas.ac.cn

Beijing National Laboratory for Molecular Sciences, the Key Laboratory of Bioorganic Chemistry and Molecular Engineering of the Ministry of Education, College of Chemistry, Peking University, Beijing 10087 (China); jianpei@pku.edu.cn

Experimental section

General Procedures. Compounds **Tr** and **TrO_3** were synthesized followed the procedure in our previous report.[1] Absorption spectra were recorded on a PerkinElmer Lambda 35 UV-vis Spectrometer. Photoluminescent (PL) spectra were carried out on a PerkinElmer LS55 Luminescence Spectrometer. Cyclic voltammetry was performed using BASI Epsilon workstation and measurements were carried out in acetonitrile containing 0.1 M *n*-Bu_4NPF_6 as a supporting electrolyte. Carbon electrode was used as a working electrode and a platinum wire as a counter electrode; all potentials were recorded versus Ag/AgCl as the reference electrode. The scan rate was 50 $mV \cdot s^{-1}$. Optical microscopy was conducted with an Olympus BX-51 microscope. Scanning electron microscopy (SEM) images were obtained with a cold field emission scanning electron microscope (Hitachi S4800) operated at an accelerating voltage of 1.0 kV. Atomic force microscopy (AFM) studies were performed with a Nanoscope IIIa microscope (Extended Multimode, Digital Instruments, Santa Barbara, CA). All experiments were carried out in tapping mode at ambient temperature. Scanning Tunneling Microscopy (STM) studies were performed with a Solver P47 apparatus under ambient conditions. The STM tips were made of electrochemically etched tungsten.

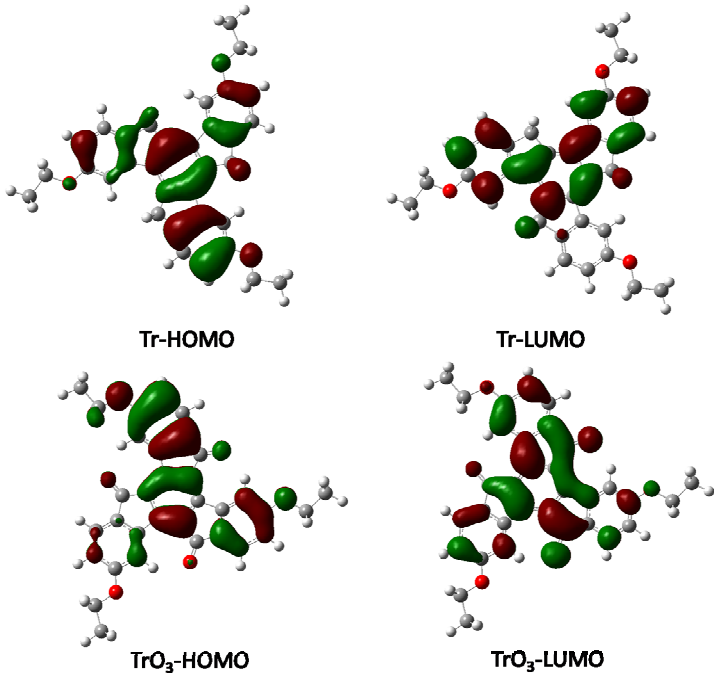

Figure S1. HOMO and LUMO distribution of **Tr** and **TrO_3** calculated by DFT using B3LYP/6-311+G (d, p)//B3LYP/6-31G (d) level. All the hexyl groups were replaced with ethyl groups for simplicity.

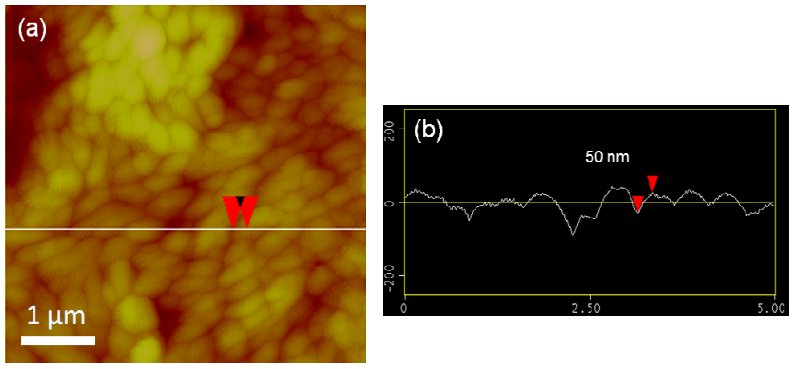

Figure S2. AFM height images (a) and cross section (b) of thin film of **1** **Tr**:**TrO_3** (1:1).

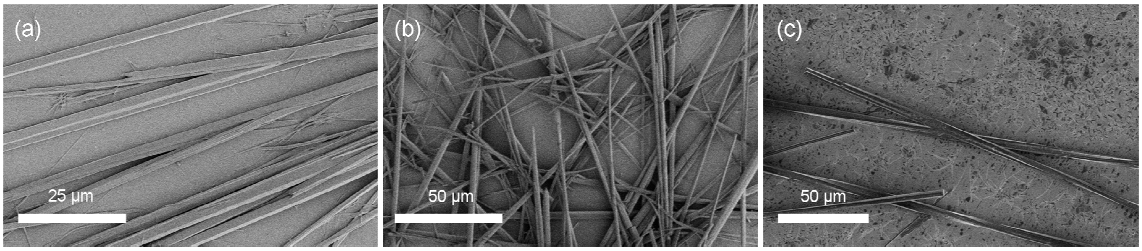

Figure S3. Scanning Electron Microscopy (SEM) images of self-assembled (a) **Tr**; (b) **TrO_3** and (c) **Tr:TrO_3** in hexane.

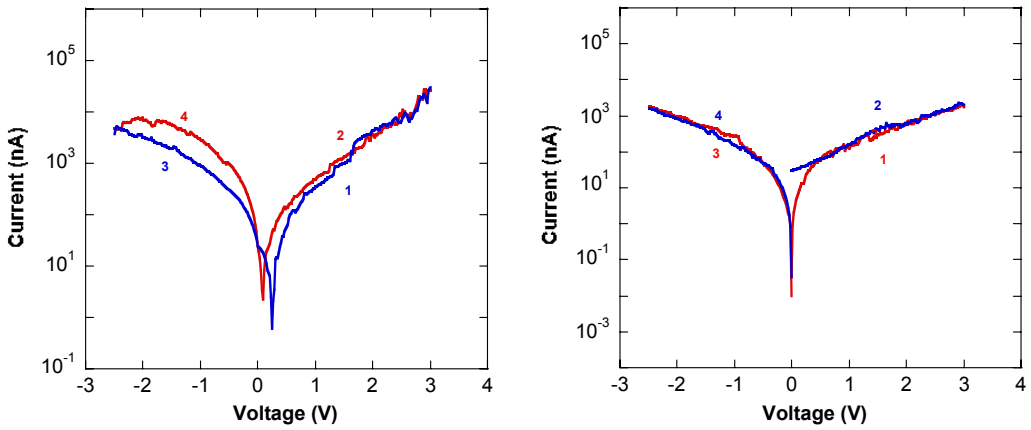

Figure S4. *I-V* characteristics of controll devices with the structure ITO/**Tr** or **TrO_3**/Al. The results suggest that no current transition from low to high level happen in single component. The numbers on the curves correspond to the scanning order.

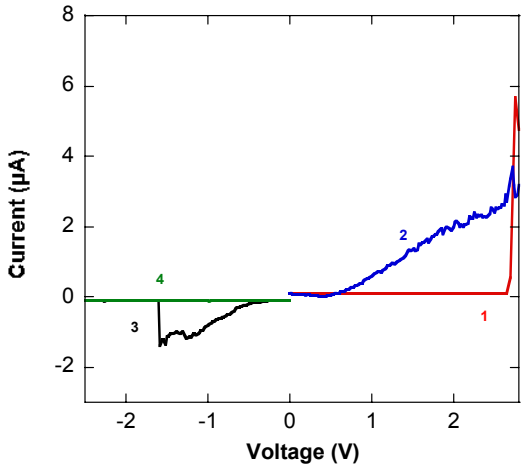

Figure S5. *I-V* characteristics of device with the double-layer structure ITO/**TrO_3**/**Tr**/Al. The results suggestthat similar flash memory effect to device fabricated by **Tr**:**TrO_3** (1:1). The number on the curves corresponded to the scanning order.

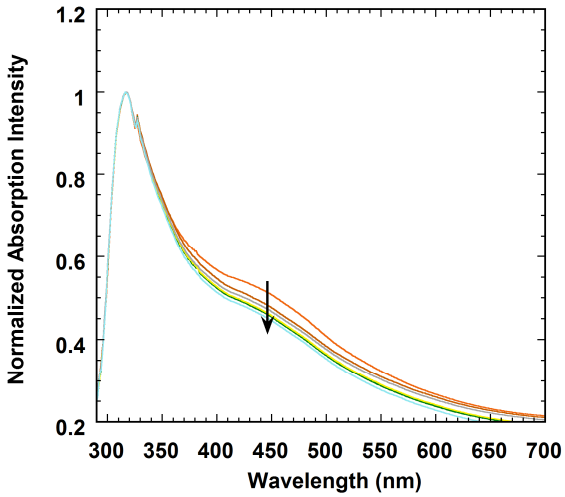

Figure S6. UV-vis absorption spectra of **Tr**:**TrO_3** film by applying a bias of -2.5 V after the film device was turned "On" by a 3 V bias. The CT transition can be erased by such a manner. The time interval is 10 s.

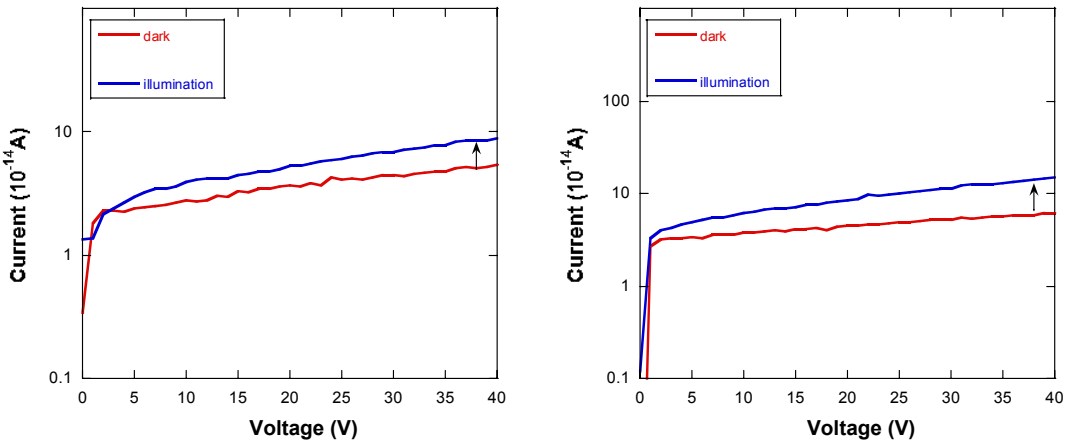

Figure S7. *I-V* characteristics of single wires of (a) **Tr** and (b) **TrO_3** under dark and illumination.