Modulation of Coordinate Bonds in Hydrogen-bonded Trimesic Acid Molecular Networks on Highly Ordered Pyrolytic Graphite Surface

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Figure S1. Figure R1. (a) STM image of the structure of TMA / Zn(NO$_3$)$_2$ with Zn(NO$_3$)$_2$ concentration 1.5$\times$10$^{-5}$ M on the graphite surface ($I = 0.46$ nA, $V = -0.63$ V); (b) STM image of the structure of TMA / Zn(NO$_3$)$_2$ with Zn(NO$_3$)$_2$ concentration 3.8$\times$10$^{-5}$ M on the graphite surface ($I = 0.44$ nA, $V = -0.56$ V); (c) STM image of TMA/Zn(NO$_3$)$_2$...
network with Zn(NO$_3$)$_2$ concentration $1.2 \times 10^{-4}$ M ($I = 0.38$ nA, $V = -0.67$ V); (d) STM image of the structure of TMA / Zn(NO$_3$)$_2$ with Zn(NO$_3$)$_2$ concentration $1.7 \times 10^{-4}$ M on the graphite surface ($I = 0.34$ nA, $V = -0.66$ V)

Figure S1 is a series of STM images recorded the relationship between Zn(NO$_3$)$_2$ concentrations and the rates of filling pores. When the concentration of Zn(NO$_3$)$_2$ is $1.5 \times 10^{-5}$ M, $3.8 \times 10^{-5}$ M and $1.2 \times 10^{-4}$ M, the rates of filling pores are about 15%, 32% and 78% (as see Figure S1(a), (b) and (c)). With the concentration of Zn(NO$_3$)$_2$ is increased to $1.7 \times 10^{-4}$ M, the pores are gradually filled up until all the pores are full of these bright features, as shown in Figure S1(d).

Figure S2. (a) STM topography image of the trimeric Fe(TMA)$_3$ network on the HOPG surface ($I = 0.27$ nA, $V = 0.75$ V); (b) high-resolution STM image of the trimeric Fe(TMA)$_3$ network ($I = 0.21$ nA, $V = 0.74$ V); (c) STM topography image of the Fe/TMA/SCN$^-$ network on the HOPG surface ($I = 0.72$ nA, $V = -0.42$ V); (d)
high-resolution STM image of the Fe/TMA/SCN⁻ network ($I = 0.61$ nA, $V = -0.64$ V).

Figure S2 shows the STM topography image of the Fe/TMA/SCN⁻ network on the HOPG surface. At first, KSCN was dissolved in ethanol with a concentration of $1.5 \times 10^{-4}$ M. Second, the coordinated network formed by TMA with FeNO₃ was fabricated on HOPG and checked by STM. 1µl KSCN solution was introduced into the coordinated network of TMA with Fe³⁺. In the following images, it is obvious that the structure of the network has been significantly changed by introducing SCN⁻. It is believed that the introduced SCN⁻ ions tend to bond with Fe³⁺ ions so that the coordination bonds between the Fe³⁺ ions and the TMA molecules are destroyed. As a consequence, the initial hexagonal coordination network is no longer preserved. This change on the coordination network caused by introduction of SCN⁻ proves that the formation of the initial network indeedly depends on the coordination bonds between the TMA molecules and the Fe³⁺ ions.