Support Information

Surface-Mounted MOF Templated Fabrication of Homochiral Polymer Thin Film for Enantioselective Adsorption of Drug

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Materials and Instrumentation

All reagents and solvents employed were commercially available and used as received without further purification. Powder XRD (PXRD) analysis was performed on a MiniFlex2 X-ray diffractometer using Cu-Kα radiation (λ = 0.1542 nm) in the 2θ range of 4–20° with a scanning rate of 0.5° min^{-1}. Evaluation of data was done with Rigaku evaluation software JADE 5.0. SEM images were measured on a JSM 6700 instrument. CD experiments were recorded with a Bio-logic MOS-450 CD Spectrometer at room temperature. CD spectra recorded for the pure quartz glass plate (which was also used as the substrate for SURMOF thin film preparation) were used as a reference. CD spectra were recorded from 600 to 200 nm in 1-nm steps using a scan speed of 20 nm min^{-1}.

Preparation of MUD SAMs on QCM sensor and OH- functional quartz glass

Commercially available quartz crystal microbalance (QCM) sensor coated with Au was immersed into a 1 mM ethanolic solution of 11-mercapto-1-undecanol (MUD) for 24 hours. All the samples are rinsed with pure ethanol and dried under nitrogen flux before the preparation of sample. Commercially available quartz glass was cleaned with the Milli-Q water and then immersed into H_2SO_4/H_2O_2 (3:1) solution at 80 ^oC for 30 min. The sample was rinsed with Milli-Q water and dried under nitrogen flux before the preparation of SURMOF.

Preparation of HKUST-1 thin film

The HKUST-1 thin film was fabricated using the following diluted ethanolic solutions: copper acetate (1 mM) and BTC (1,3,5-benzenetricarboxylic acid) (0.4 mM). The spray method adopted in this work has been described previously[34]. The spray times were 15 s for the copper acetate solution and 25 s for the BTC solution. Each step was followed by a spray step with pure ethanol to remove residual reactants. A total of 30 growth cycles were used for HKUST-1 grown on MUD functionalized QCM sensor and OH-terminated quartz glass substrates.

Preparation of porous poly(L-DOPA) thin film

The pre-synthesized HKUST-1 thin film was put in the L-DOPA by immersing the sample into L-DOPA solution (0.1mg/L, ethanol/H_2O (9:1) for solvent) with glass culture dish. At the same time, UV irradiation (365 nm) with under air atmosphere was applied to illuminate the sample for 30 min continuously. Then the sample was clear with pure ethanol for characterization (XRD, IRRAS) and poly(L-DOPA)/HKUST-1 thin film was obtained. After XRD, IRRAS measurement, the sample was immersed into HCl solution (pH = 4) for etching HKUST-1. Then the obtained porous poly(L-DOPA) thin film was prepared successfully for next characterizations (XRD, IRRAS and CD) and enantioselective study.

Preparation of patterned SURMOF HKUST-1

1mM of MHDA solution is deposited on a clean polydimethylsiloxan (PDMS) stamp for 2 min. After drying with nitrogen, the stamp is gently pressed on the clean Au

substrate for 1 min to get a patterned MHDA SAMs substrate. In order to enhance the quality of the patterned substrate, the patterned substrate is immersed into 1mM 1-Decanethiol solution for 1 min to block the non-patterned area with 1-decanethiol as shown in Fiugre S

Quartz crystal microbalance (QCM) performance

A commercial QCM 200 with a flow module for measurements in gas phase was used to monitor the mass uptake of present porous poly(L-DOPA) thin film prepared on QCM working electrodes.

The setup of gas phase QCM includes mass flow controllers for controlling the flow rate of the carrier gas (e.g. Ar or N_2) and analyte storage container. The system is flushed with carrier gas at the setting temperature for about 10 min, which establish the baseline for the loading experiment. When the frequency is stable, the loading experiment is started by admitting analyte molecules to the storage container. From the recorded different frequencies, the mass of molecular loading is calculated. The pure ethanol was for the reference in this study. When start the gas phase QCM experiment, the system is activated by the carrier gas at 65 °C for 12 h. Then R- and S-naproxen ethanolic solution was prepared with the same concentration of 0.5 mM for QCM adsorption study.

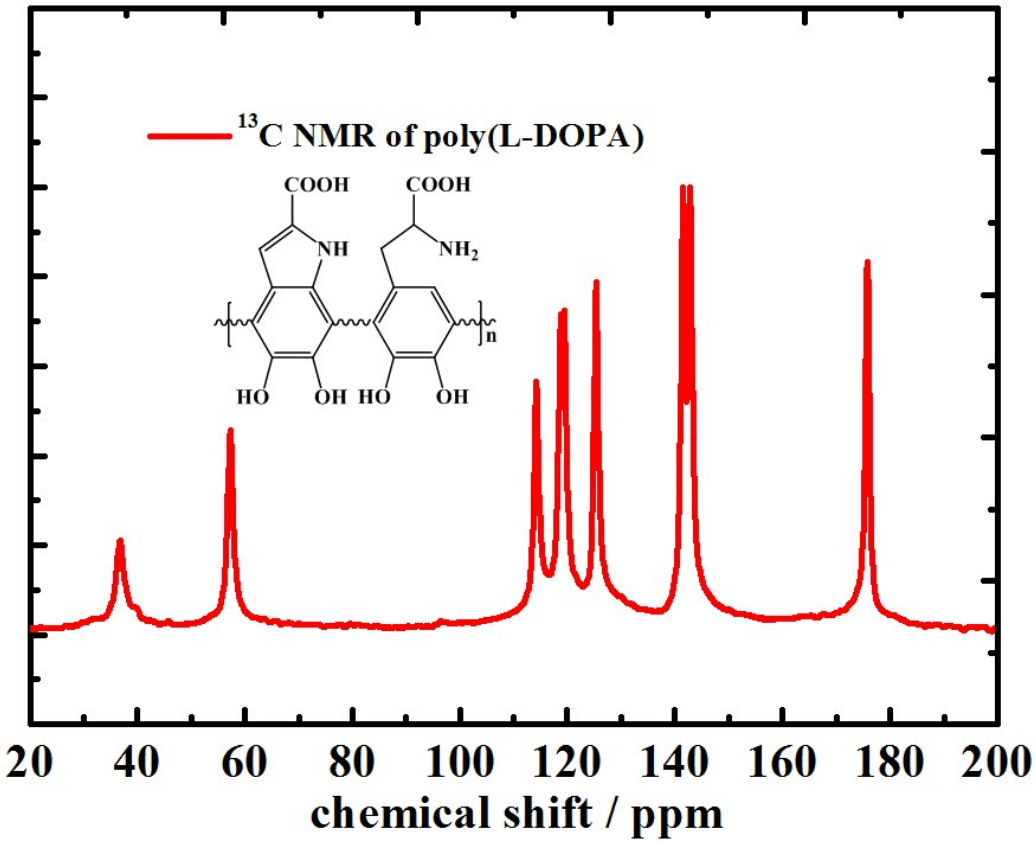

Figure S1. The solid state NMR spectrum of poly(L-DOPA).

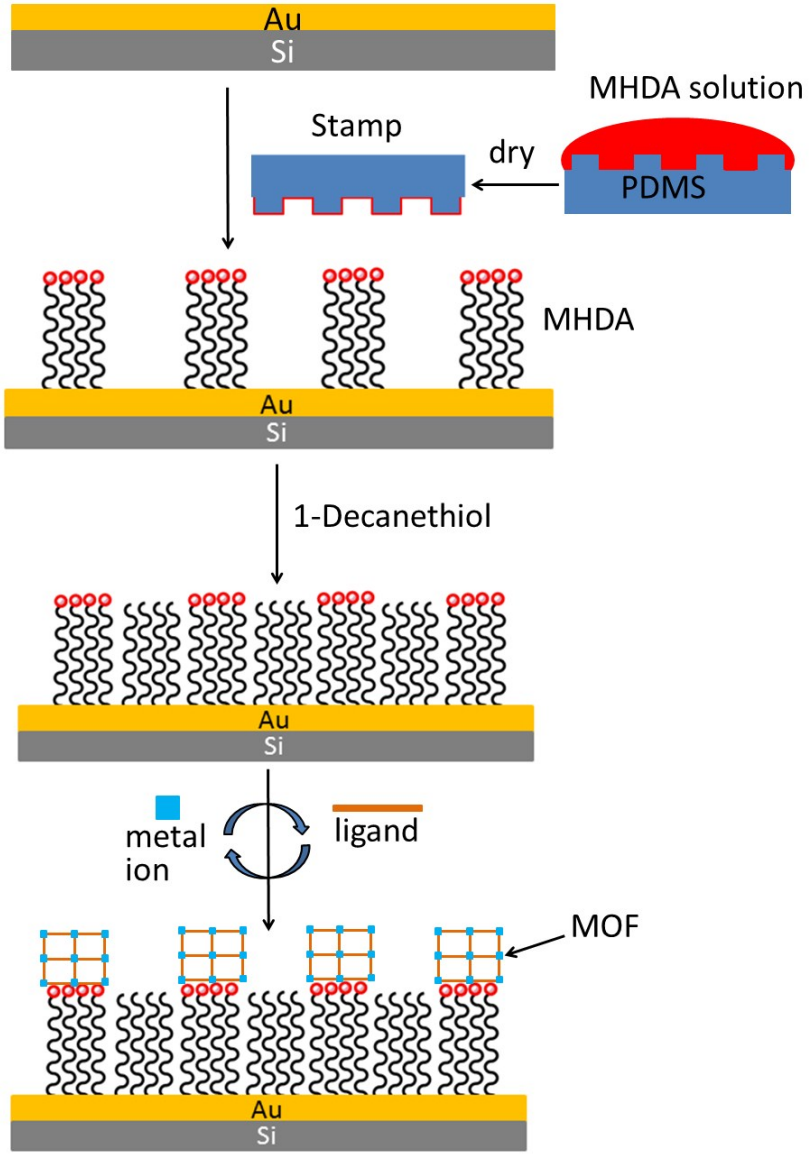

Figure S2. The patterned SURMOF grown on a patterned substrate prepared with Micro contact printing (μCp) stamp.

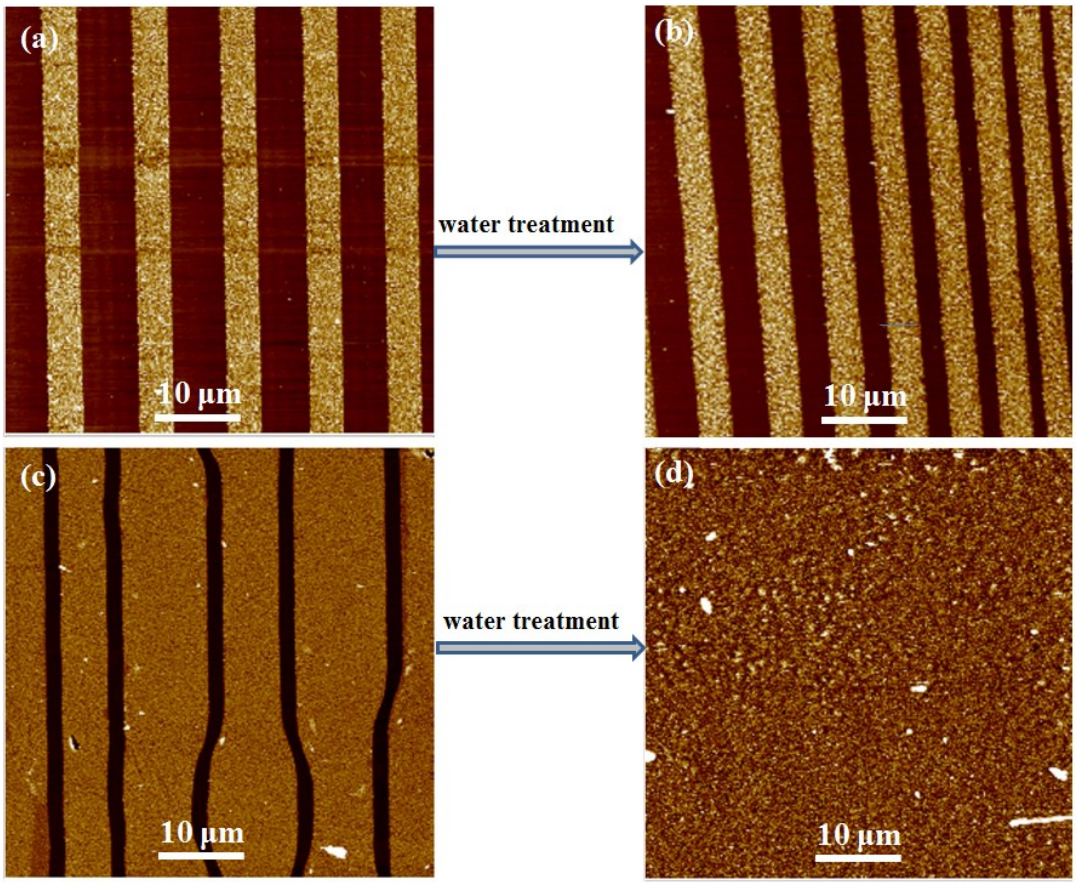

Figure S3. AFM analysis of patterned samples before and after water treatment: (a) patterned poly(L-DOPA)@HKUST-1 thin film before and after water solution for 30 min. pristine patterned SURMOF HKUST-1 thin film (c) and pristine sample after water treatment (d).

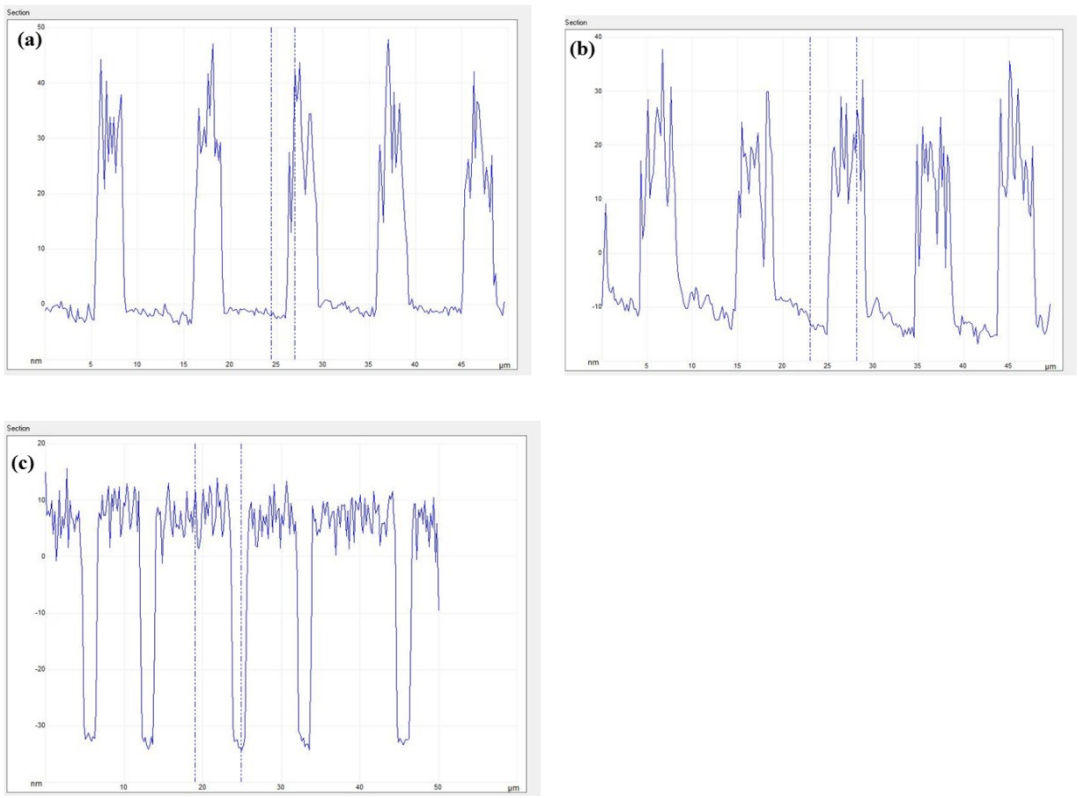

Figure S4. AFM analysis of patterned samples before and after water treatment: (a) patterned poly(L-DOPA)@HKUST-1 thin film before and after water solution for 30 min; (c) pristine patterned SURMOF HKUST-1 thin film.

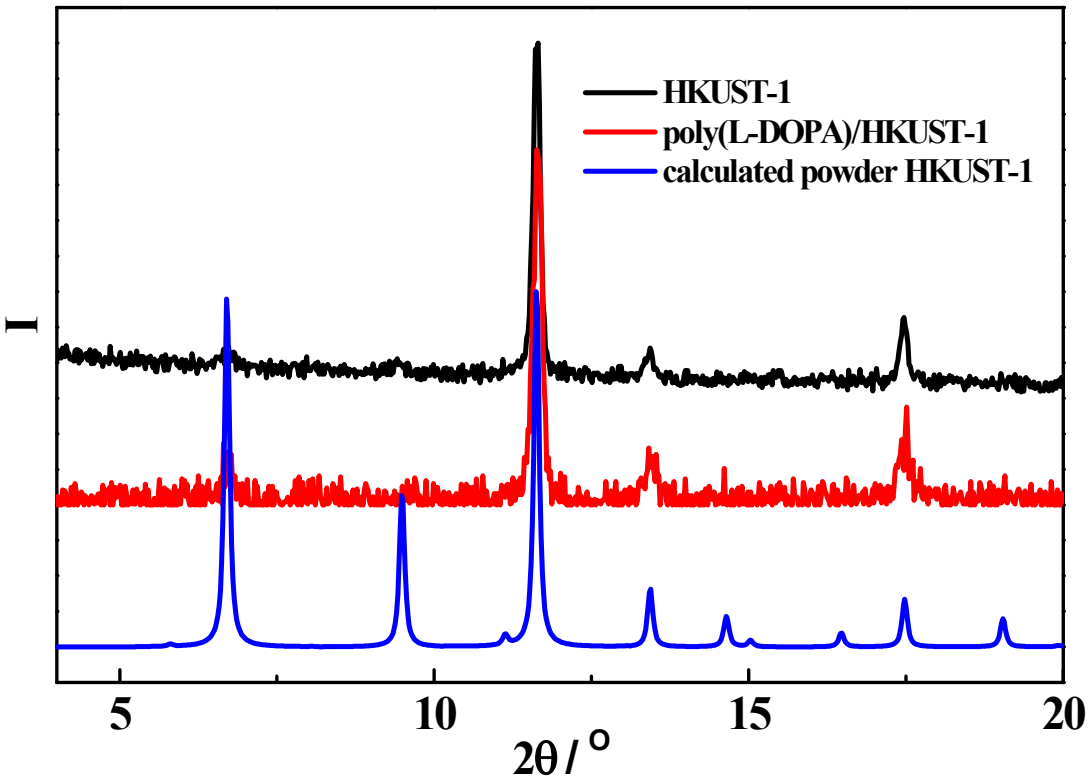

Figure S5. The XRD characterization of the growth process from MOF, L-DOPA loaded MOF to chiral porous polymer poly(L-DOPA) thin film grown on quartz glass.

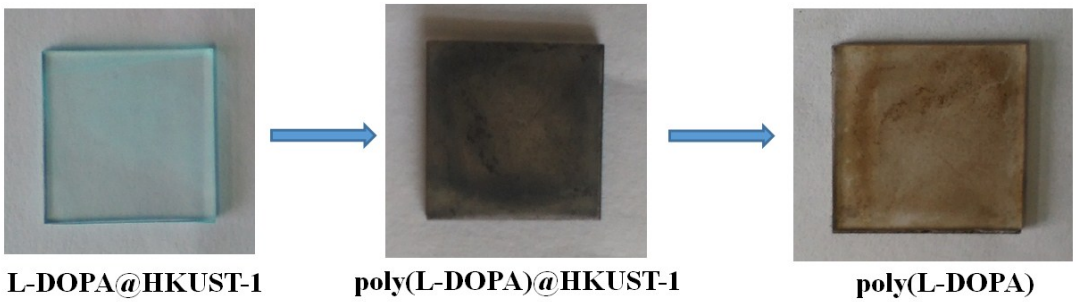

Figure S6. Photo images of the growth process L-DOPA loaded MOF to chiral porous polymer poly(L-DOPA) thin film grown on quartz glass.

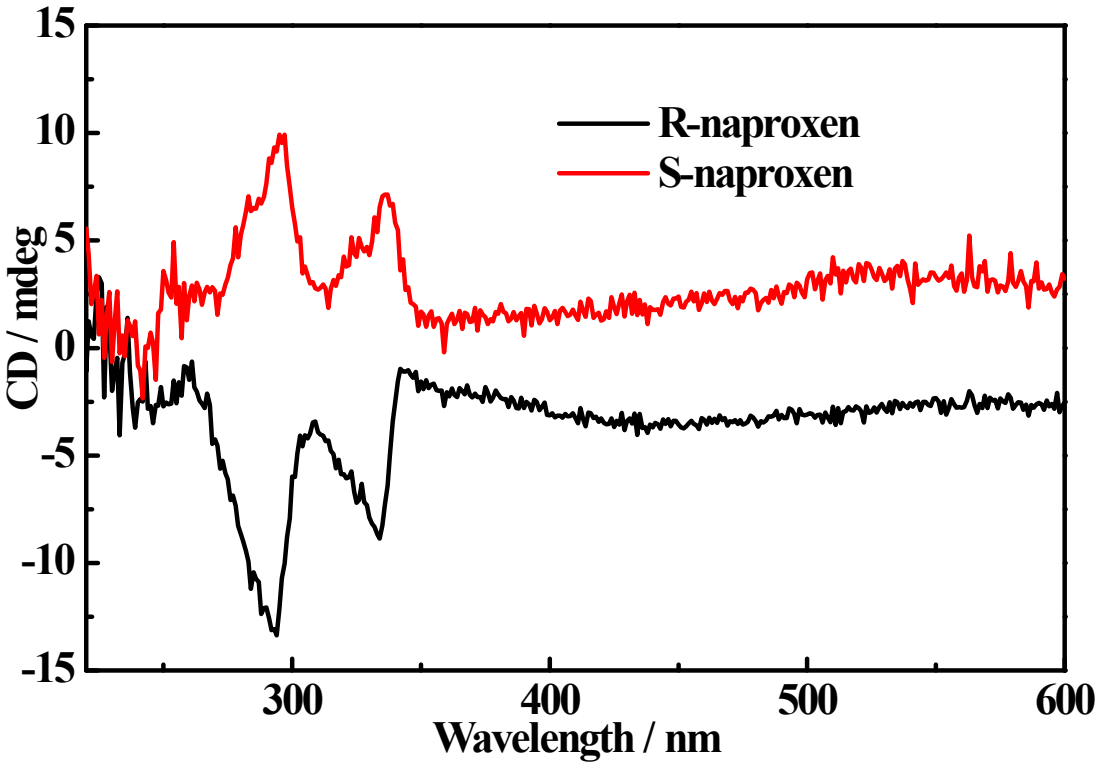

Figure S7. Solid CD of R-naproxen and S-naproxen.

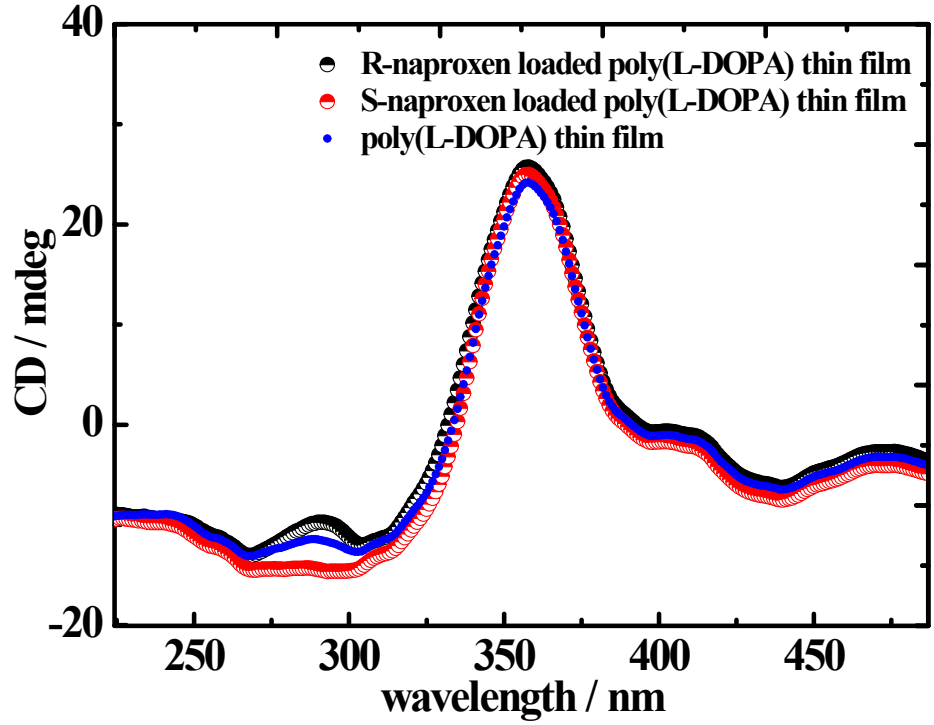

Figure S8. Solid CD of R-naproxen and S-naproxen loaded poly(L-DOPA) thin film grown on quartz glass.

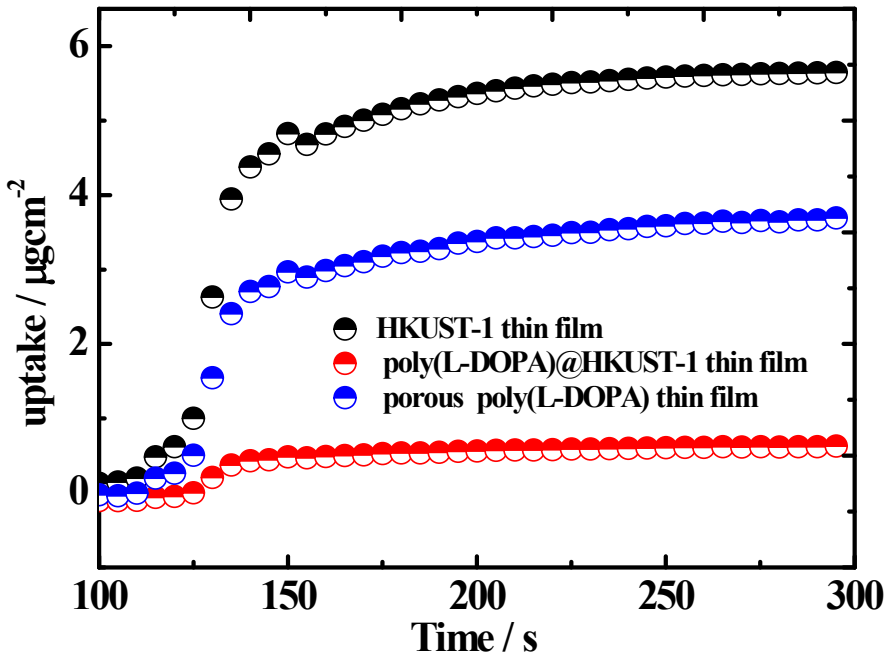

Figure S9. The ethanol uptake of pristine HKUST-1 and poly(L-DOPA)@HKUST-1 thin film.

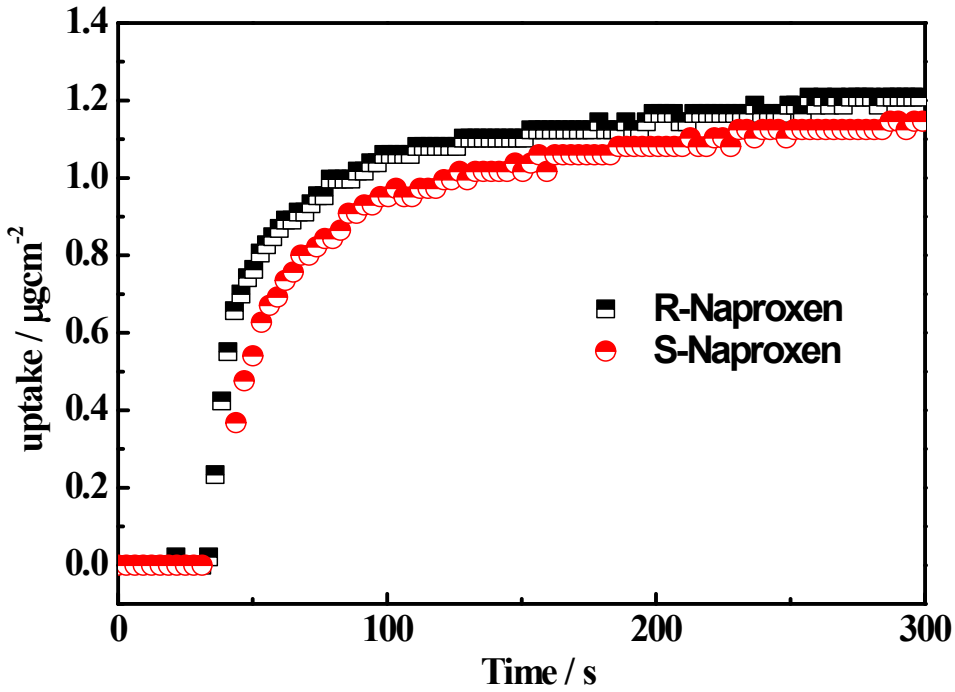

Figure S10. The uptake of R-naproxen and S-naproxen adsorption in pristine HKUST-1 thin film.