Supporting Information

Self-Adaptive Hydrophilic and Coordinating Teflon Surfaces Through a Straightforward Physisorption Process

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1- General

All reagents were obtained from commercial sources and used as received unless noted otherwise. The chloroform (stabilised over amylen) used for the adsorption of the porphyrins was first passed through a column of basic alumina and then distilled over K_2CO_3 to remove any traces of acid. Teflon tape (Roth) was used as received. Teflon foils pieces (thickness 0.1 cm) were cleaned under ultrasound in a pentane bath and then in acetone followed by drying under vacuum for 30min. Infrared spectra were recorded on a Perkin Elmer Spectrum 100 FTIR spectrometer at room temperature equipped with a Pike Miracle^{TM} single reflection ATR system. The spectra (from 4000 to 650 cm^{-1}) were obtained from 20 scans, with a resolution of 1 cm^{-1}. The water contact angles were measured on a DSA 100 goniometer from Krüss. Electronic absorption spectra were recorded on a Hitachi U3300 spectrophotometer (300 − 800 nm scan range). Fluorescence spectra (from 370 to 700 nm) were recorded on a fluorolog SPEX 212 spectrofluorimeter. Data acquisition and data processing were controlled with SpectrAcq Datamase runned by Grams/32 software. The excitation wavelength was 357 nm. SEM images were recorded at the Centre de Ressource en Microscopie Electronique et Microanalyse (CREMEM) of the University of Bordeaux on a ZEISS EVO50 microscope. Surface areas were obtained with a Micromeritics ASAP 2010 employing the Brunauer–Emmett–Teller (BET) method. Physisorptions of **2** on rigid Teflon have been performed using a dip-coater from Nima Technology. The AFM images were recorded in a tapping mode on a Thermomicroscope CP Research Atomic Force Microscope in air at constant temperature (23°C).

2- Copper titration by a colorimetric dithizone assay

2-1 On Teflon tape

A piece of Teflon tape (25 mg) is immersed in a 10 mM perfluorodecaline solution of **2** and then dried under vacuum for 30 min. The modified tape is dipped in a biphasic system consisting of 50 mL of milliQ water at a pH of 2-3 (adjusted with acetic acid) and 50 mL of a dichloromethane solution of dithizone (1 x 10^{-4} M). The system is then vigorously stirred for 5min. After standing for 10 min, the two phases are separated and the absorption spectrum (300 − 800 nm scan range) of the organic phase is recorded. The formation of dithizonate copper(II) complex was indicated by the colour change from green to pink. Copper(II) ions are titrated using the molar extinction coefficients at 620 nm of the dithizone and dithizonate copper(II) complex which are 31100 and 12400 $M^{-1}.cm^{-1}$, respectively.

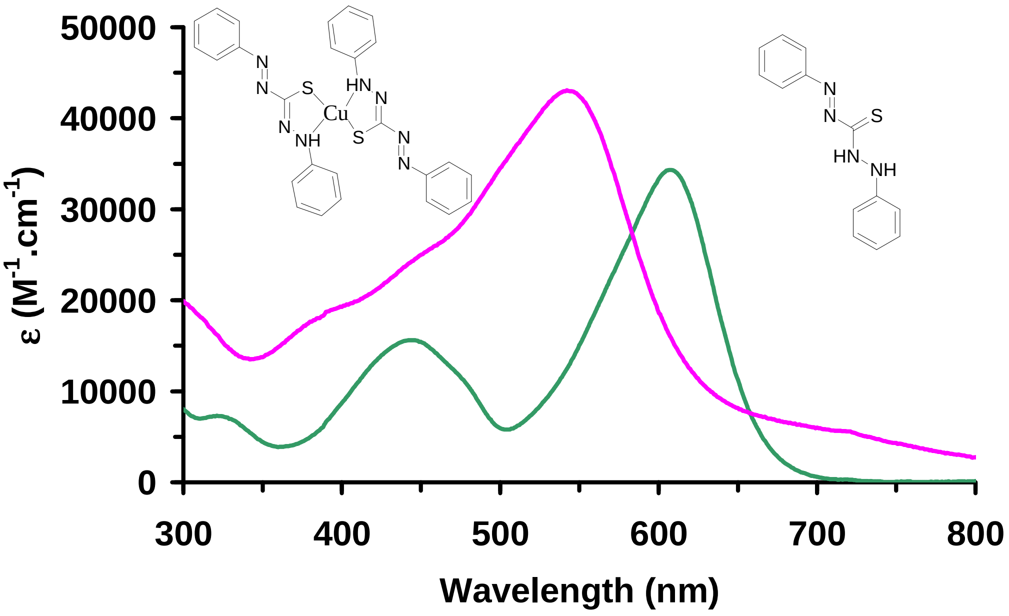

Figure S1. Absorption spectra of dithizone (green) and the copper(II)-dithizonate complex (pink)

2-2 On Rigid Teflon foil

1 cm^2 of a piece of rigid Teflon is vertically immersed in a 10 mM perfluorohexane solution of **2** using a dip-coater, removed at a rate of 30 mm x min^{-1} and then dried under vacuum for 30 min. The modified Teflon is titrated using the procedure described above using 5 mL of

water (instead of 50 mL) and 5 mL of a 2 x 10^{-6} M dichloromethane solution of dithizone (instead of 50 mL at 1 x 10^{-4} M).

3- Copper titration by a colorimetric porphyrin assay

A piece of Teflon tape (25 mg) is modified as described in the paragraph 2-1 and dipped in 20 mL of a chloroform solution of *meso*-tetraphenylporphyrin TPP (10^{-4} M) containing 20 equiv of collidine per porphyrin. The mixture is refluxed under argon for 17 h and the absorption spectrum (300 − 800 nm scan range) of the porphyrin solution is recorded. The formation of the metallated porphyrin (CuTPP) was indicated by the colour change from purple to red. Copper(II) ions are titrated using the molar extinction coefficients of TPP and CuTPP at 538 nm which are 4350 $M^{-1}.cm^{-1}$ and 19610 $M^{-1}.cm^{-1}$, respectively.

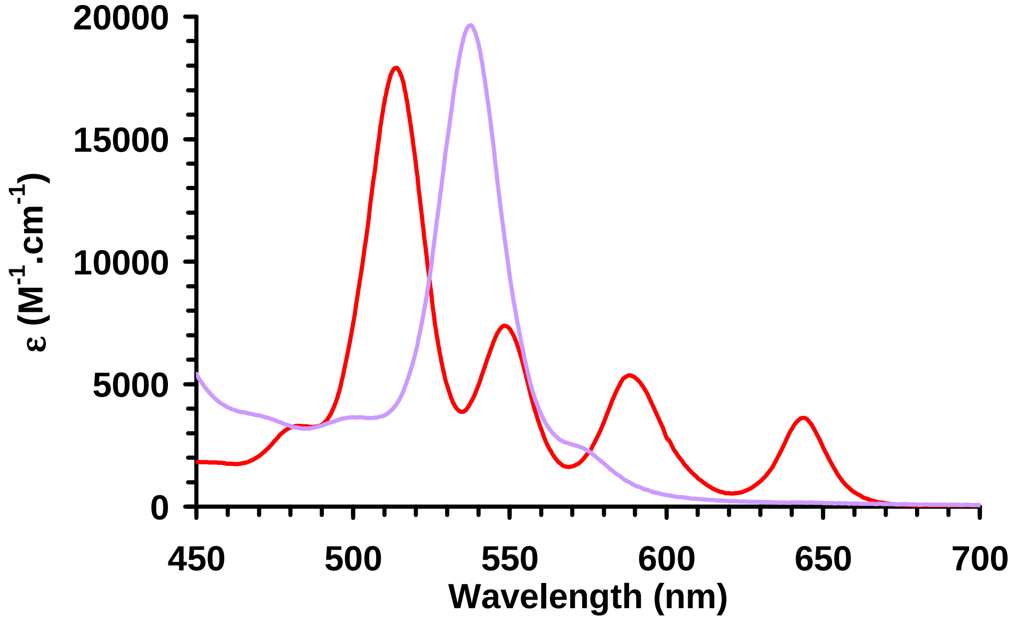

Figure S2. Absorption spectra of TPP (red) and of CuTPP (purple)

4- ATR-FTIR

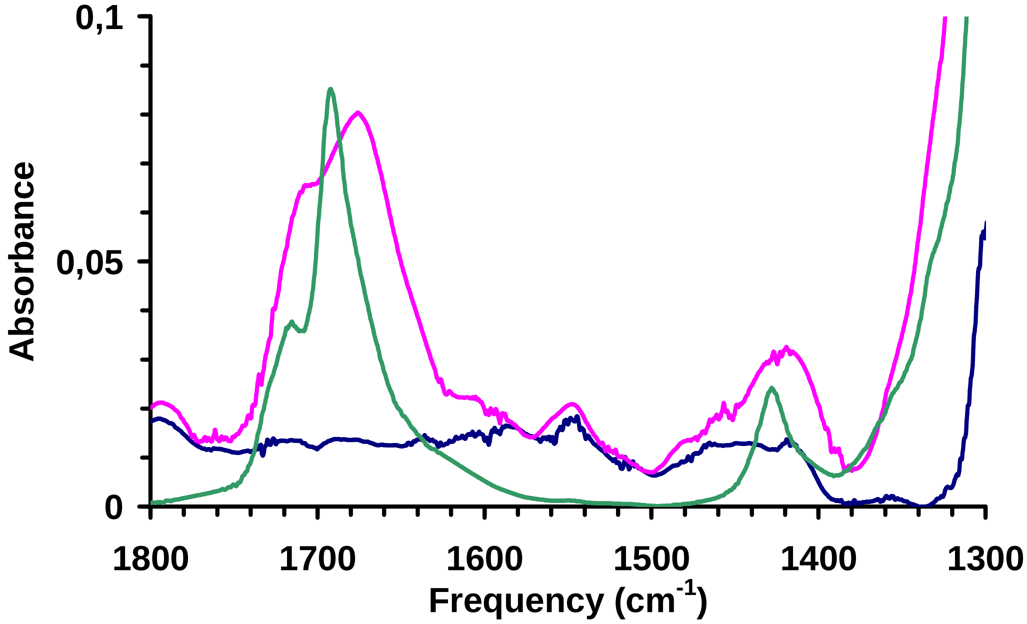

Figure S3. ATR-FTIR spectra of Teflon tape (blue), **2** (green) and Teflon tape modified by **2** (pink)

5- AFM

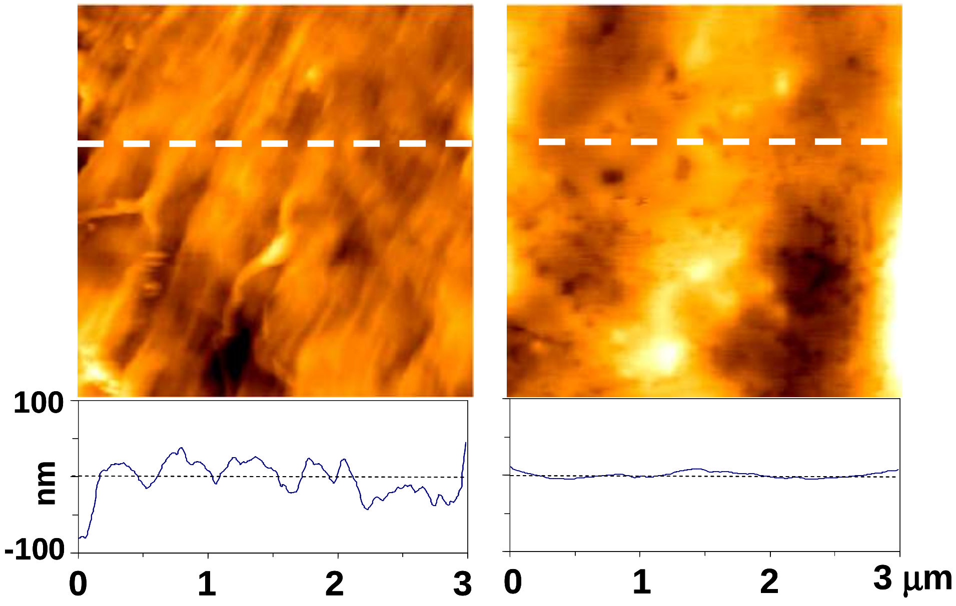

Figure S4. AFM topography images of Teflon surfaces before (left) and after (right) coating with **2** (experimental conditions given in the manuscript).

6- Solubility of 2 in various solvents

A heterogeneous mixture composed of 40 mg of **2** (70 mg when using benzotrifluoride) and 2 mL of a given solvent (octane, toluene, dichloromethane, acetonitrile, water or benzotrifluoride) is vigorously stirred for 1 min at 20 °C. After standing for 4 h, the absorption spectrum (300 − 800 nm scan range) of the upper phase is recorded. Saturation concentration is estimated using the molar extinction coefficient of **2** at 780 nm in perfluorodecaline (155 $M^{-1}.cm^{-1}$).

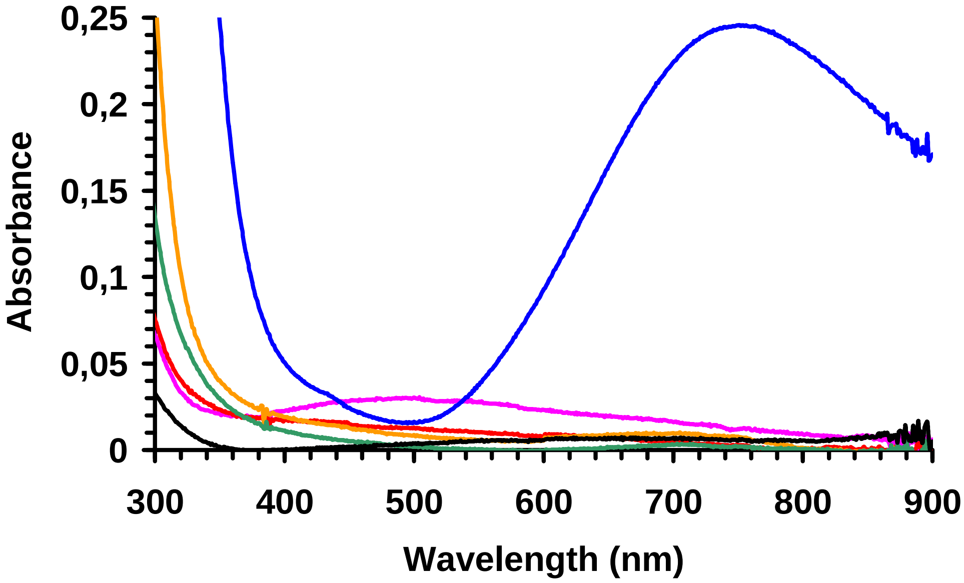

Figure S5. Absorption spectra of saturated solutions of **2** in octane (black), toluene (pink), dichloromethane (red), acetonitrile (orange), water (green) and benzotrifluoride (blue)