

Supporting Information

Porphyrin-Based MOF Thin Film on Transparent Conducting Oxide: Investigation of Growth, Porosity and Photoelectrochemical Properties

Ben Gikonyo ¹, Fangbing Liu ¹, Saly Hawila ², Aude Demessence ², Herme G. Baldovi ³, Sergio Navalón ³, Catherine Marichy ^{1,*} and Alexandra Fateeva ^{1,*}

¹ Laboratoire des Multimatériaux et Interfaces, Université Lyon, Université Claude Bernard Lyon 1, UMR CNRS 5615, F-69622 Villeurbanne, France

² Université Lyon, Université Claude Bernard Lyon 1, Institut de Recherches sur la Catalyse et l'Environnement de Lyon (IRCELYON), UMR CNRS 5256, F-69626 Villeurbanne, France; aude.demessence@ircelyon.univ-lyon1.fr (A.D.)

³ Departamento de Química, Universitat Politècnica de València, C/Camino de Vera, s/n, 46022 Valencia, Spain; hergarba@cam.upv.es (H.G.B.); sernaol@doctor.upv.es (S.N.)

* Correspondence: catherine.marichy@univ-lyon1.fr (C.M.); alexandra.fateeva@univ-lyon1.fr (A.F.)

Table of contents

AFM data	SI3
MOF thin film thickness	SI4
Ellipsometry porosimetry measurement of the Al-PMOF thin film	SI5
Recyclability photocurrent experiments	SI6
Thermal stability of Al-PMOF thin film	SI7

◆ AFM data

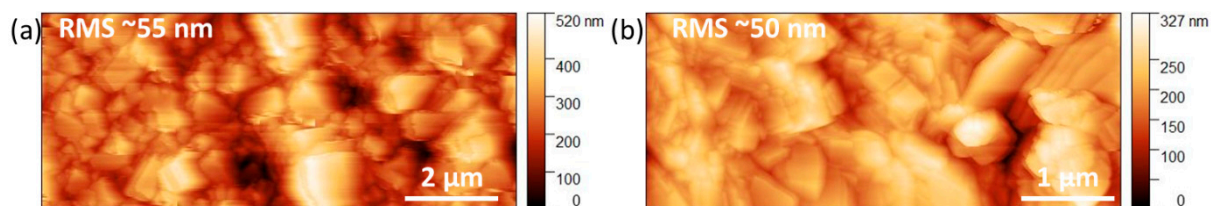


Figure S1. (a) 10x10 μm and (b) 5x5 μm AFM images of Al-PMOF thin film on Si wafer obtained from 800 cycle and 400 cycle- Al_2O_3 ALD films, respectively. RMS roughness of approximately 50-55 nm is determined independently of the thickness of the starting oxide film. The bare Si substrate presents a RMS roughness of 0.3 nm.

◆ MOF thin films thicknesses

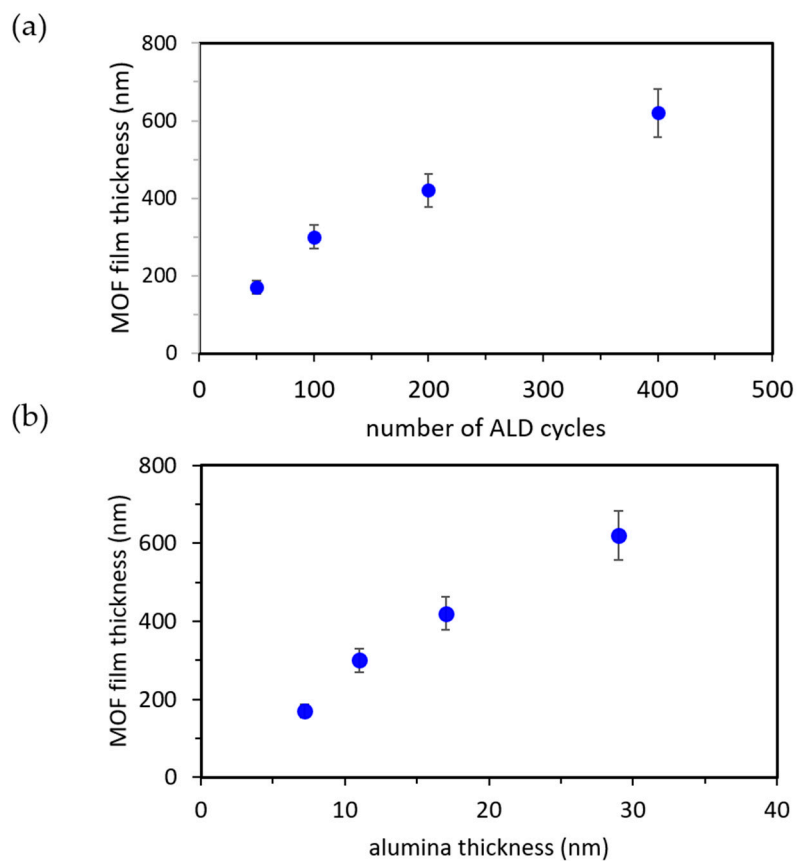


Figure S2. MOF thin films on Si thickness deduced from cross-section SEM data, as a function of the ALD number of cycles (a) and as a function of ALD grown layer thickness (b).

- ◆ Ellipsometry porosimetry measurement of the Al-PMOF thin film

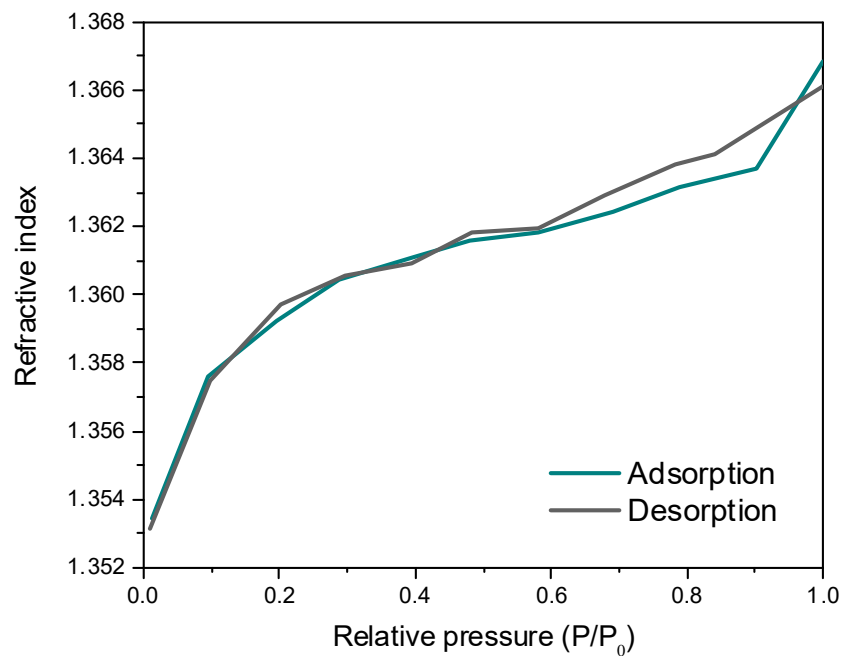


Figure S3. plot of the refractive index variation throughout adsorption and desorption of water vapour.

◆ Recyclability photocurrent experiments

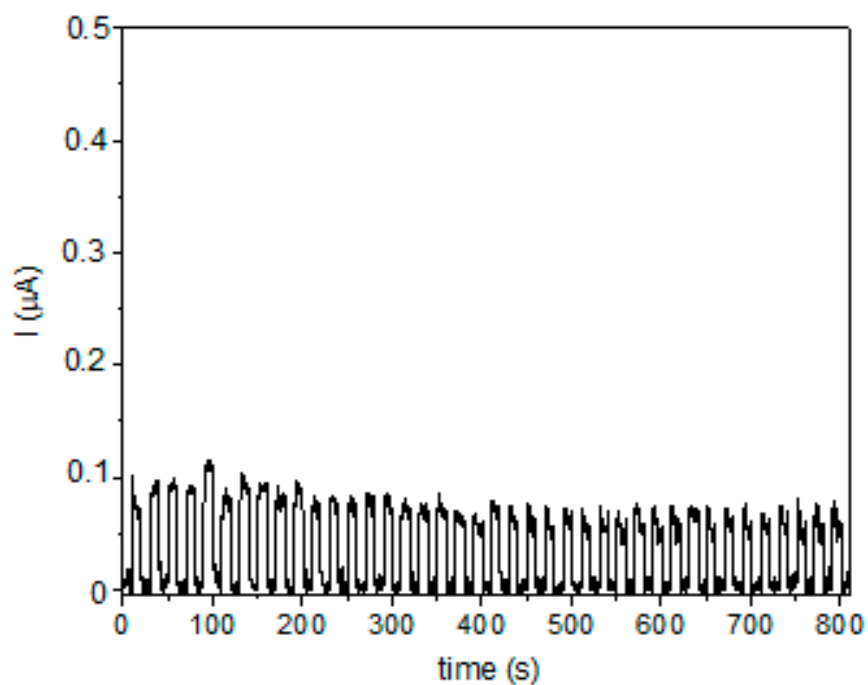


Figure S4. Chronoamperogram showing photocurrent produced by Al-PMOF (black line) thin film supported on FTO as WE polarized at +0.4 V and using Ar-purged acetonitrile solution of TBAPF₆ (0.2 M) under forty consecutive on/off simulated sunlight irradiation cycles every 10 s.

◆ Thermal stability of Al-PMOF thin film

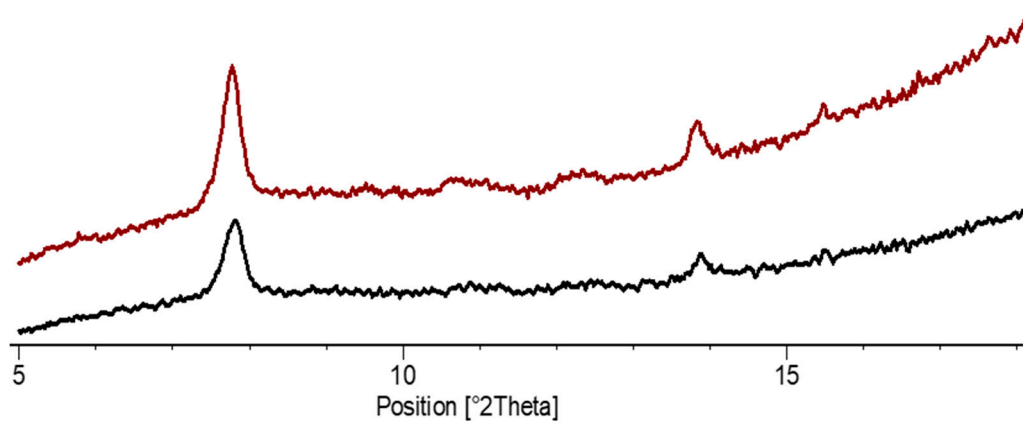


Figure S5. PXRD patterns of Al-PMOF thin films on FTO grown from alumina deposited in 100 ALD cycles, before (bottom) and after (up) a thermal treatment at 120°C for 4 hours.