Supporting information

Evolution of anodic product from Mo metal in absolute ethanol and humidity sensing under an ambient condition

Chengsheng Ni*[†,‡,§], Darragh Carolan[‡], Jianing Hui[§], Conor Rocks[‡], Dilli Padmanaban[‡], Jiupai Ni[†], Deti Xie[†], Zeguo Fang[§], John Irvine[§], Paul Maguire[‡] and Davide Mariotti[‡]

† College of Resources and Environment, Southwest University, Beibei, Chongqing, 400716, China

‡ School of Engineering, Ulster University, Jordanstown Campus, Shore Road, Newtownabbey, Northern Ireland, UK, BT37 0QB

§ School of Chemistry, University of St Andrews, Fife, KY16 9ST, Scotland, UK

*Email: C.N.: nichengsheg@swu.edu.cn; nichengsheg@163.com

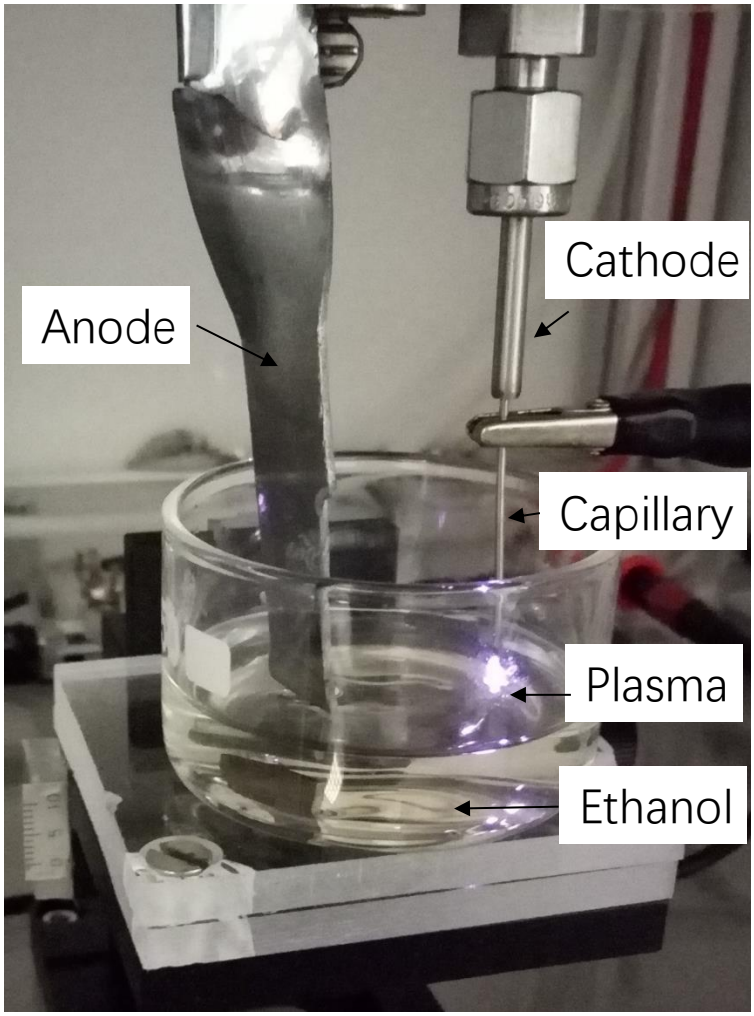

Figure S1 Set-up for the DC-plasma assisted anodic oxidation of Mo foil. The initial electrolyte is pure ethanol, which turns yellowish after the electrochemical reaction.

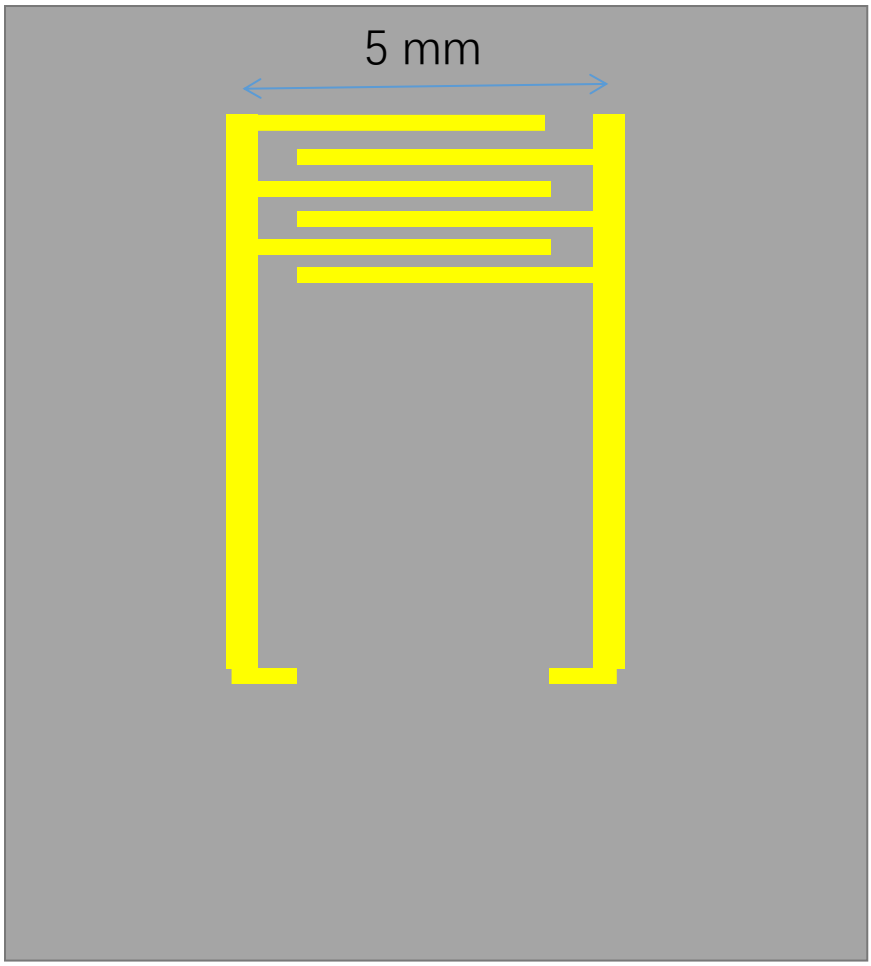

Figure S2. Schematic of the interdigital electrode: thickness of fingers 0.1 mm and vertical spacing 0.1 mm. The substrate is alumina.

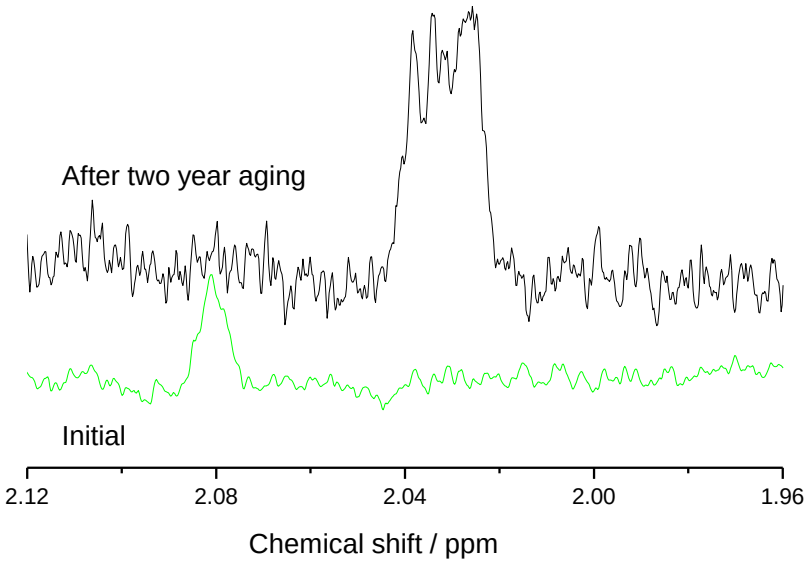

Figure S3. Close up image of the ^{1}H NMR spectra for the fresh and aged smaple. The chemical shift is close to that of H_3COO-. The variance of chemical shift between the two spectra is in accord with those for -CH_3 and -CH_2.

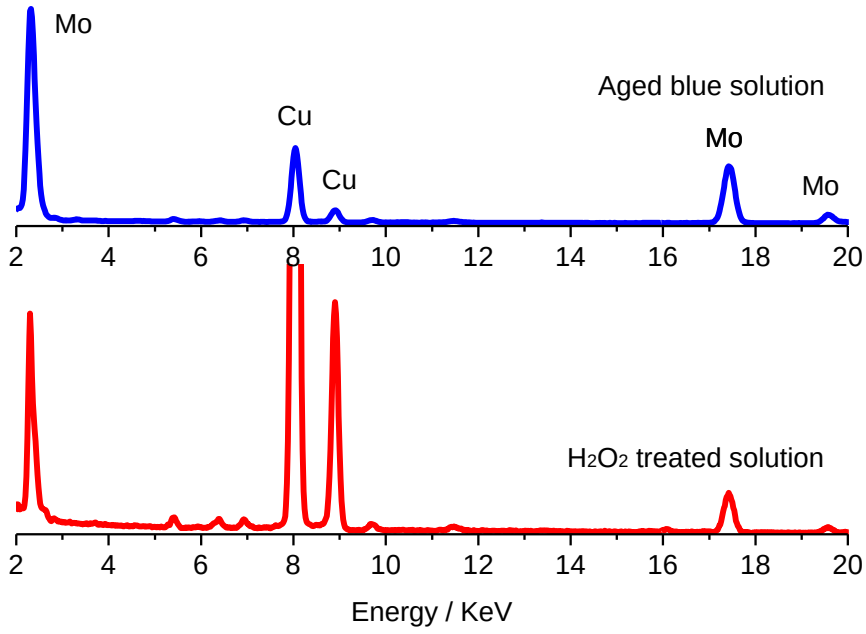

Figure S4. EDS of crystals from the suspension after aging for three weeks with and without H_2O_2 treatment.

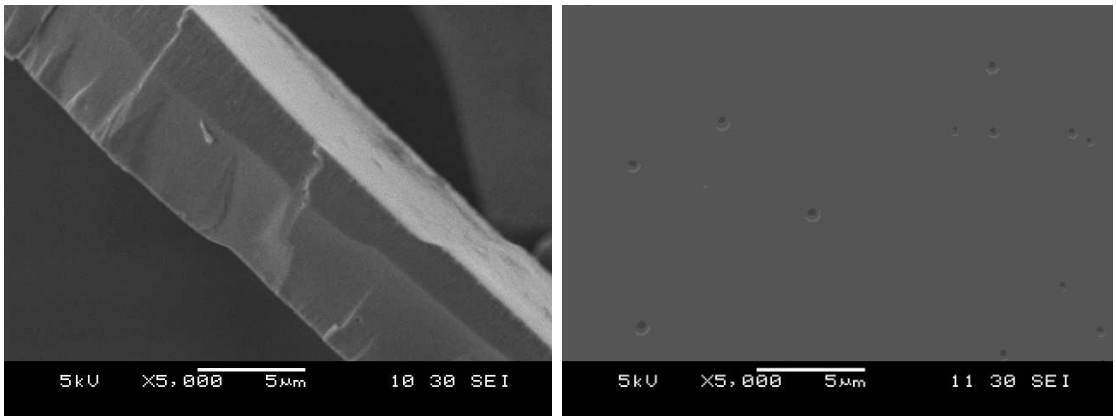

Figure S5. SEM image of the sample dried at 80 ºC in air. An obvious stratification is observed in the left cross-sectional image.

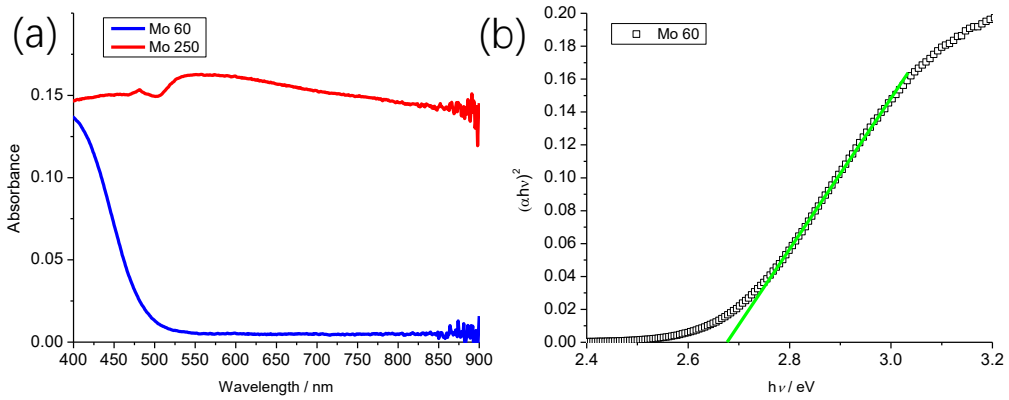

Figure S6. Absorbance (a) of the coating dried at 60 ºC and 250 ºC and tauc plot for the sample dried at 60 ºC. The band gap of the film dried at 60 ºC is determined to be 2.68 eV.

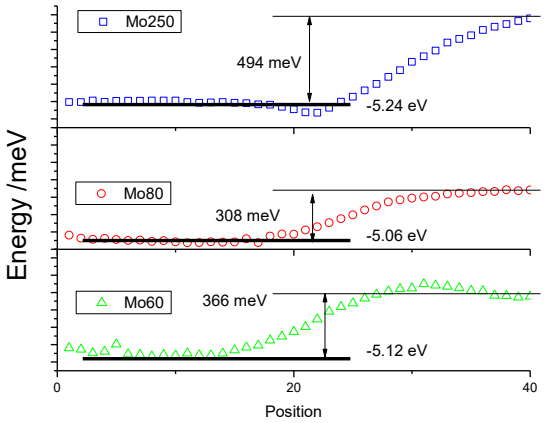

Figure S7. Kelvin probe measurement in relation to gold reference as a function of partial resolution. The workfunction of p-type Si (-4.8 eV) is indicated in the thin lines and the one for the treated sample is indicated in thick ones. The arrows in the image stood for the energy difference.

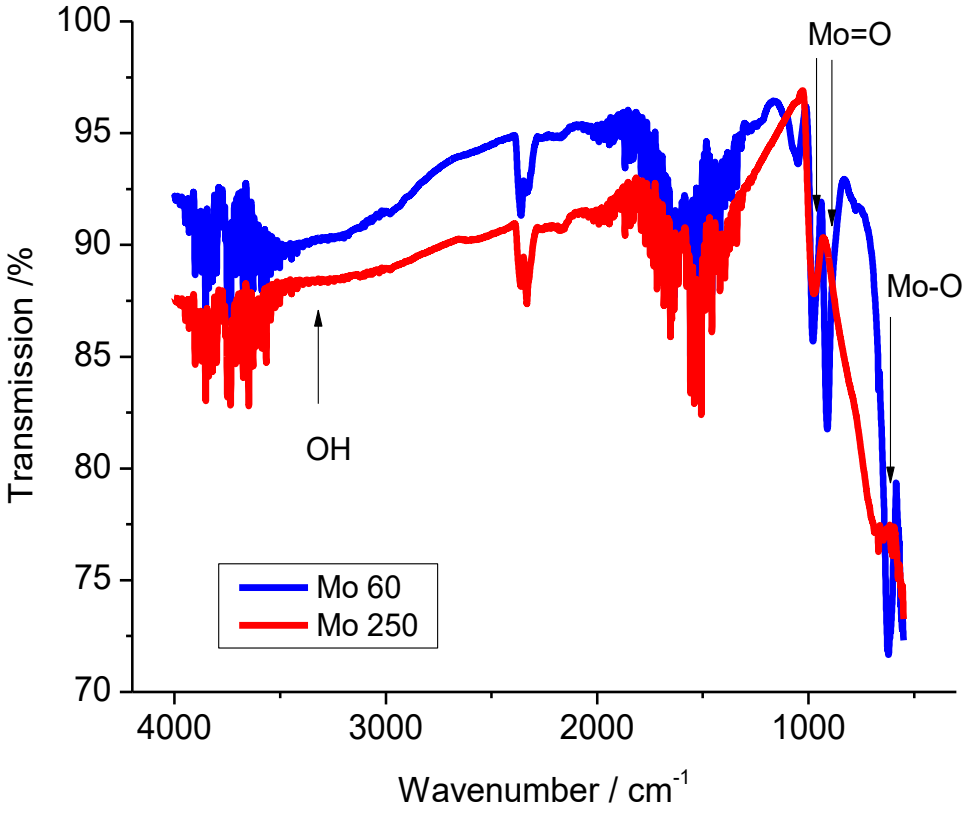

Figure S8. FTIR of the solid sample prepared via drying the suspension at 60 ºC and 250 ºC.