

***Operando* observation of the dynamical SEI formation on a carbonaceous electrode by Near-Ambient Pressure XPS**

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Supplementary information

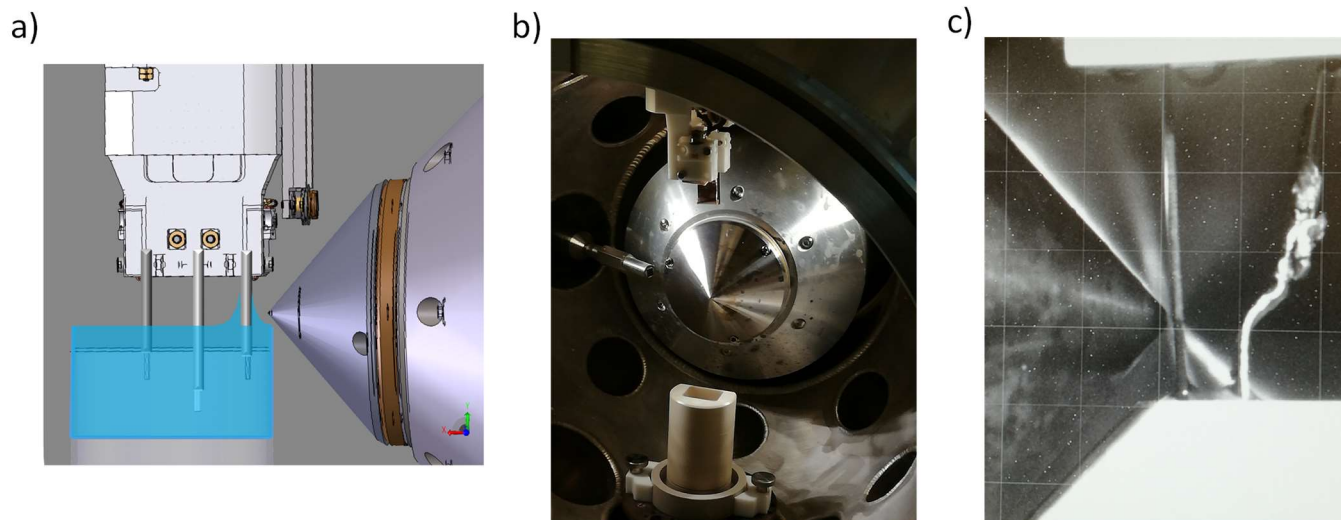


Figure S1 : Experimental dip and pull setup: (a) and (b) Schematic view and photo of the electrochemical cell and photoelectron analyzer; (c) Photo taken during the experiment.

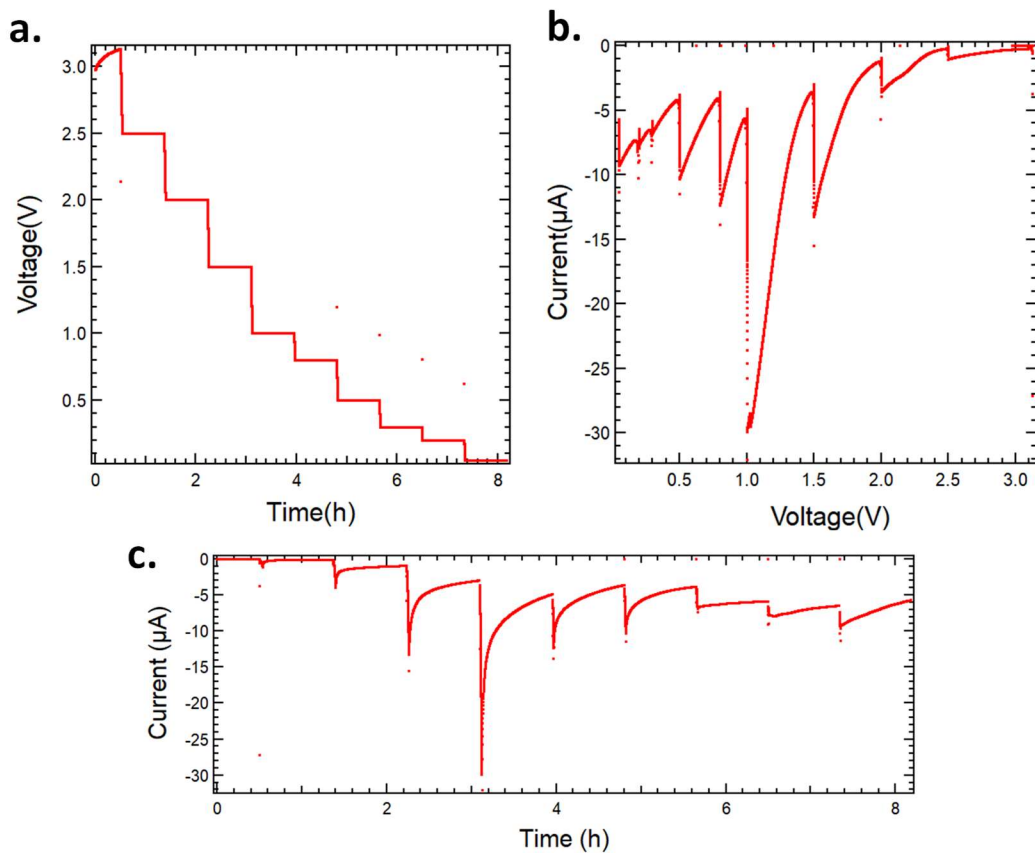


Figure S2 : Electrochemical behaviour of the cell in the in-house argon glovebox: **(a)** Voltage vs. time profile applied from OCV (Open Circuit Voltage) to 0.05 vs. Li^+/Li ; **(b)** Resulting current intensity vs. voltage curve; **(d)** Variation of the current intensity vs. time.

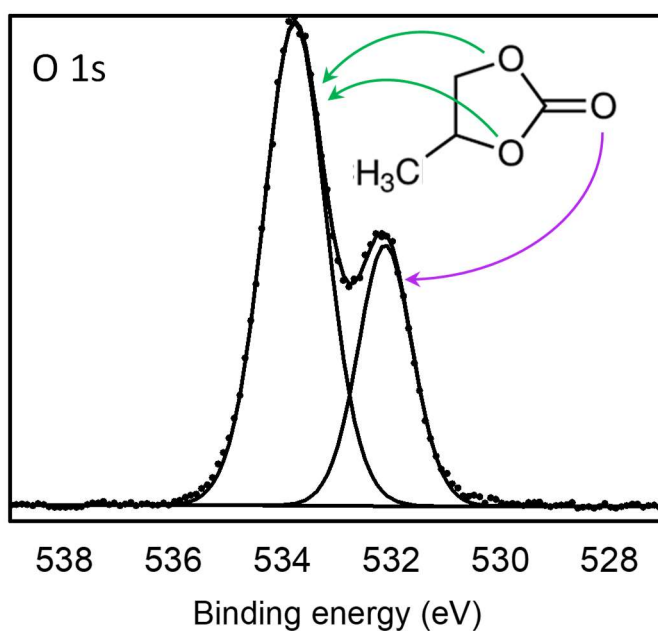


Figure S3 : O 1s spectrum of pure PC solvent, as a frozen liquid drop at $T = -140^{\circ}\text{C}$ under ultra-high vacuum (in-house XPS spectrometer at $h\nu = 1486.7$ eV).

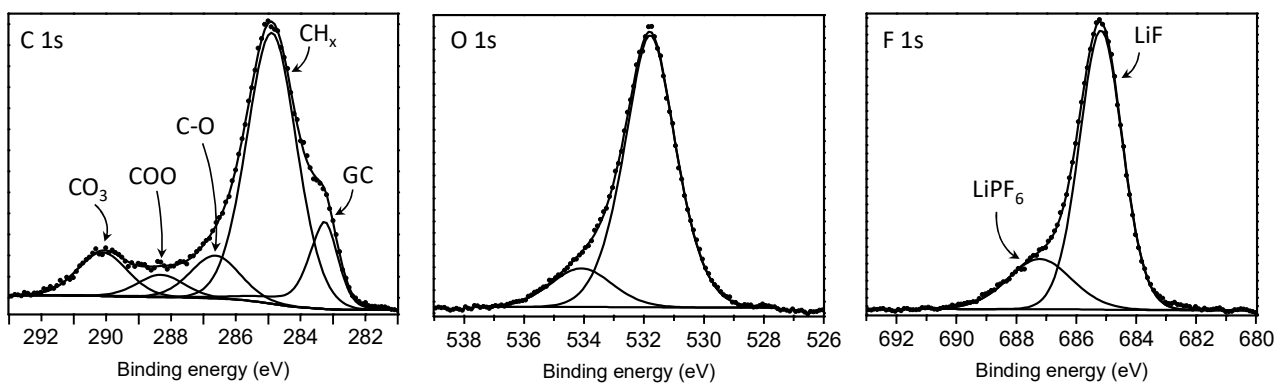


Figure S4 : *Ex situ* XPS C 1s, O 1s and F 1s spectra of the GC electrode's surface, recorded in vacuum after the end of the *operando* dip & pull experiment (which was stopped at 0.05 V applied potential).