

Supporting Information

A comprehensive study of poly(2,3,5,6-tetrafluoroaniline): from electrosynthesis to heterojunctions and ammonia sensing

Mickaël Mateos^a, Rita Meunier-Prest^{a}, Olivier Heintz^b, Frederic Herbst^b, Jean-Moïse Suisse^a,
Marcel Bouvet^{a*}*

^aInstitut de Chimie Moléculaire de l'Université de Bourgogne (ICMUB), UMR CNRS 6302, Université Bourgogne Franche-Comté, 9 avenue Alain Savary, 21078 Dijon cedex, France. Tel: +33-380-396-086; E-mail: marcel.bouvet@u-bourgogne.fr; rita.meunier-prest@u-bourgogne.fr

^bLaboratoire Interdisciplinaire Carnot de Bourgogne (LICB), UMR CNRS 6303, Université Bourgogne Franche-Comté, 9 avenue Alain Savary, 21078 Dijon cedex, France

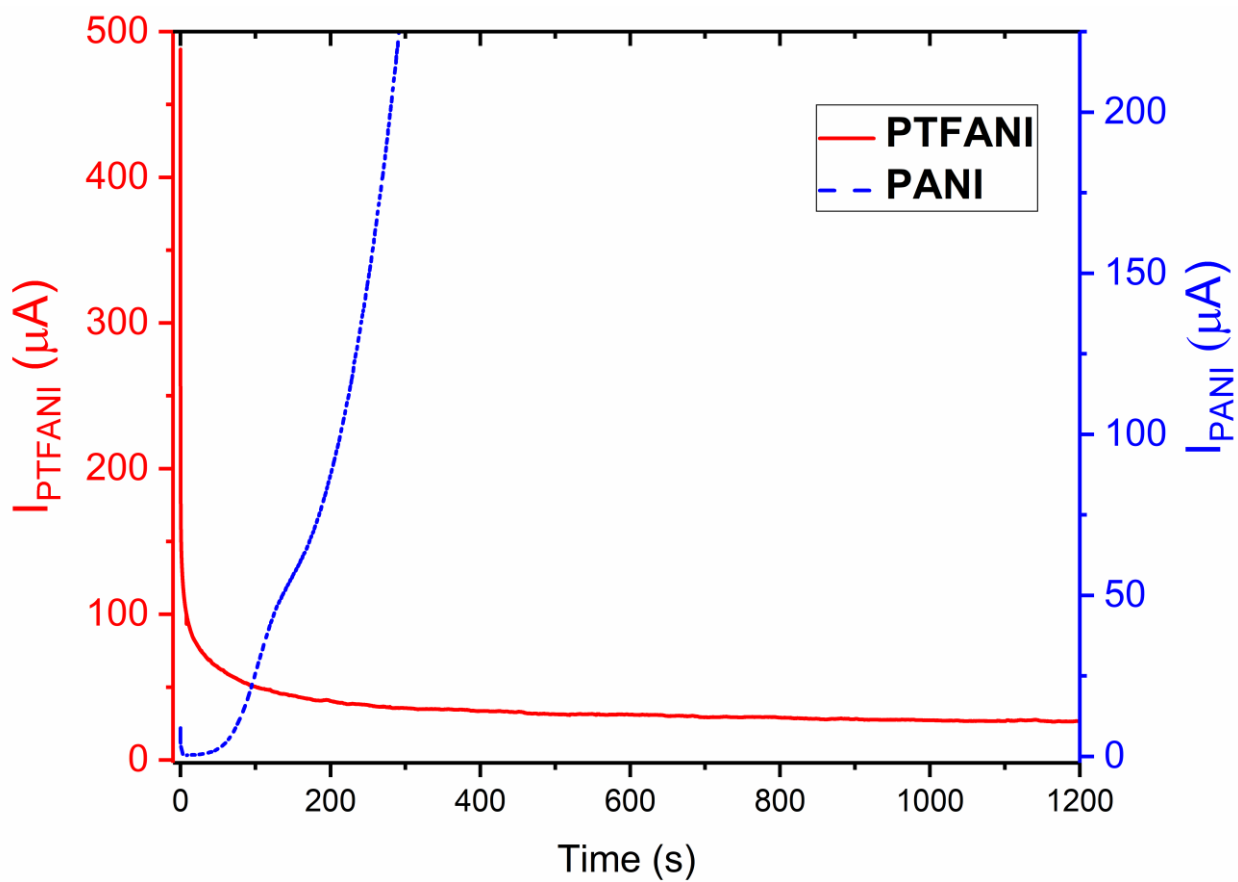


Fig. S1. Chronoamperometric curves registered for the electrodeposition processes of PTFANI and PANI films

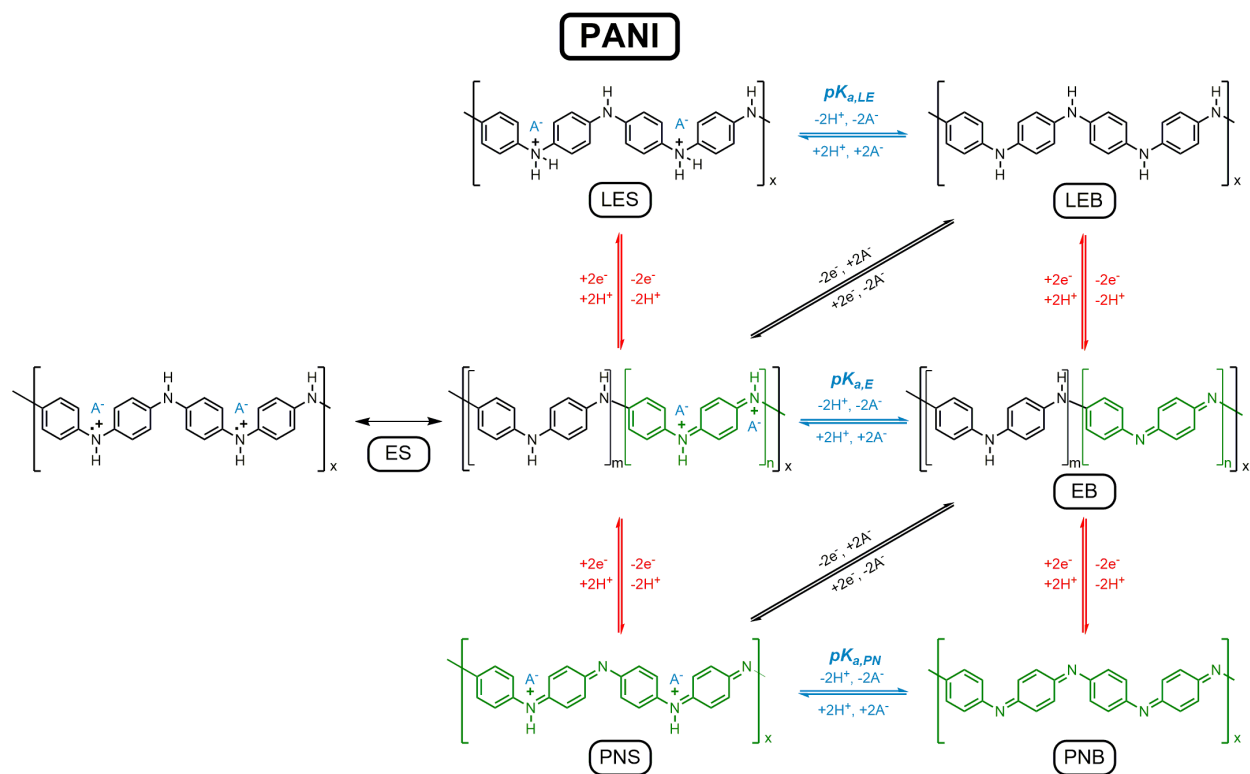


Fig. S2. Detailed reaction scheme of PANI. The quinoid forms are in green. The left ES structure corresponds to the bipolaron form, also called poly(semiquinone radical cation).

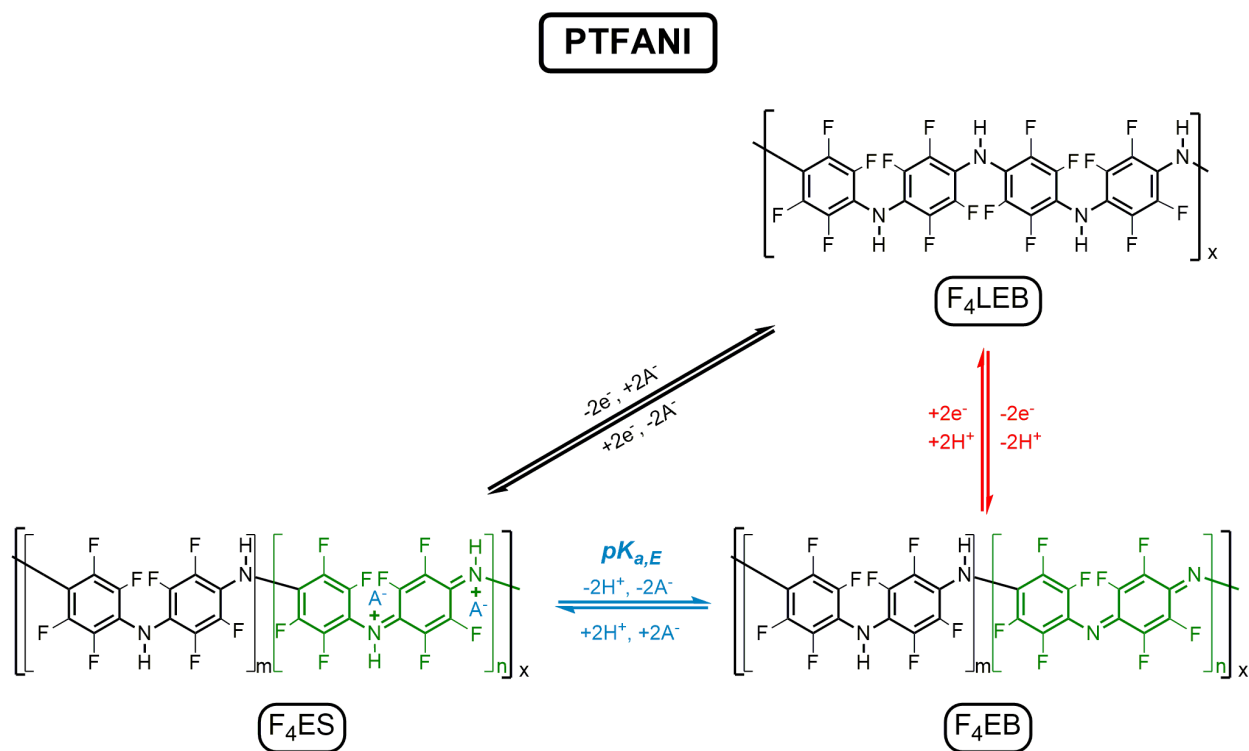


Fig. S3. Detailed reaction scheme of PTFANI. The quinoid forms are in green.

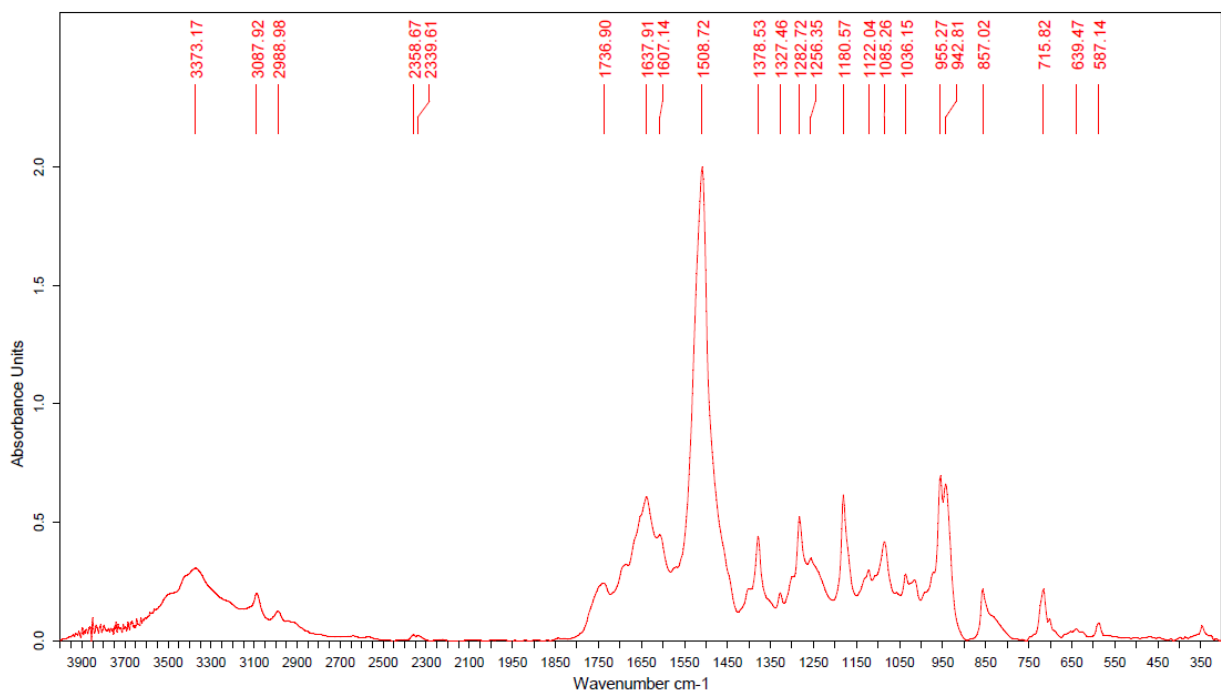


Fig. S4. Infrared (IR) spectra of polytetrafluoaniline (PTFANI) powder with KBr pellet in transmission mode

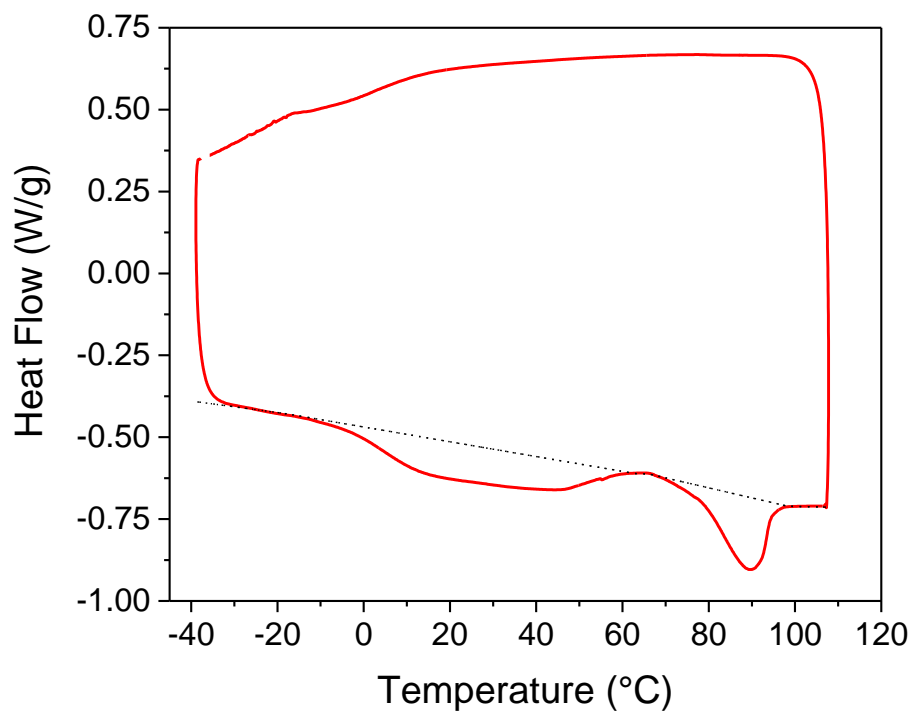


Fig. S5. DSC thermogram of PTFANI powder at $20^{\circ}\text{C}\cdot\text{min}^{-1}$

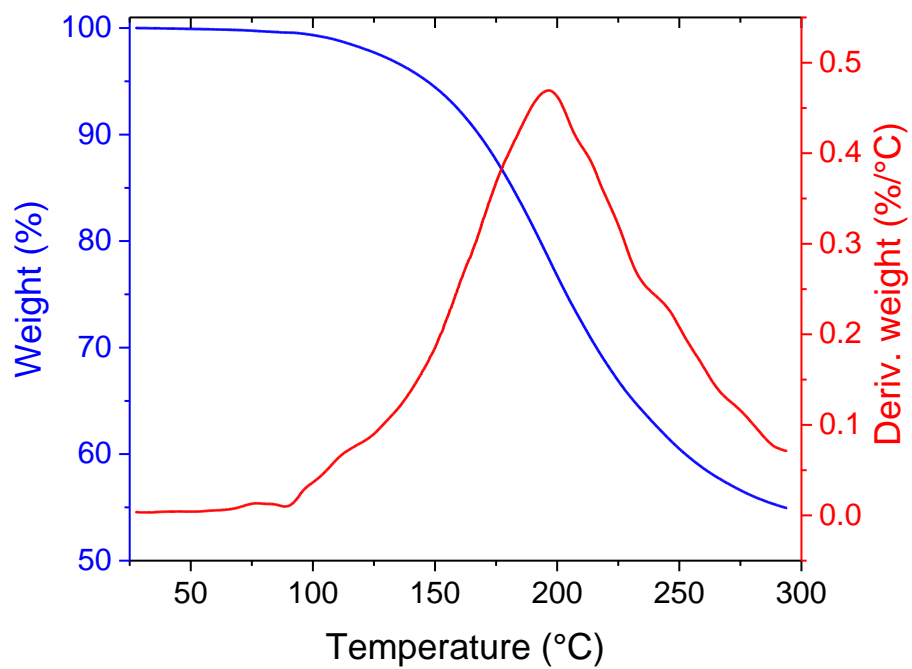


Fig. S6. TGA of PTFANI powder at a heating rate of $10^{\circ}\text{C}\cdot\text{min}^{-1}$

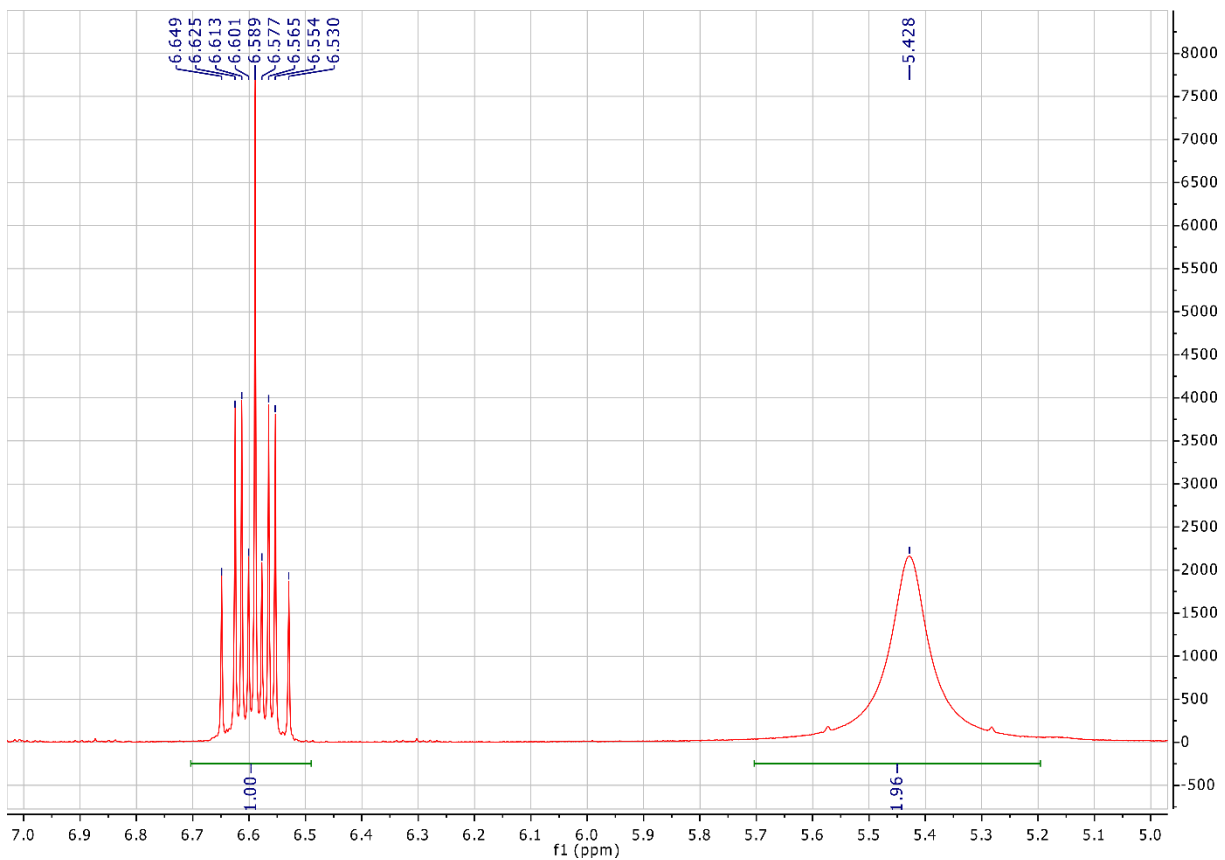


Fig. S7. ¹H NMR spectrum of TFANI in deuterated acetone

¹H NMR (300 MHz, CDCl₃): δ (ppm) 5.43 (2 H, broad s, NH₂), 6.59 (1 H, tt, $J_{H-F2,F3} = 10.7$ Hz, $J_{H-F1,F4} = 7.2$ Hz, H_{Ar}).

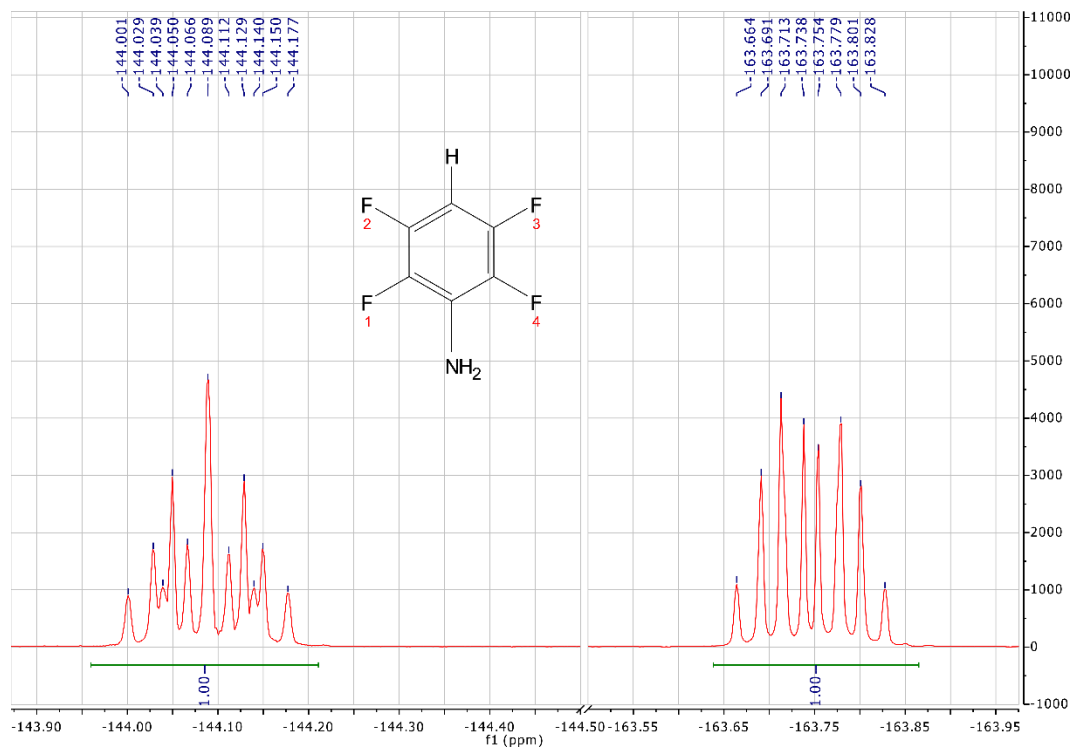


Fig. S8. ^{19}F NMR spectrum of TFANI in deuterated acetone

^{19}F NMR (282.4 MHz, CDCl_3): δ (ppm) -163.75 (2F, ddd, $J_{F1-F2} = 25.1$ Hz, $J_{F1-F3} = 15.8$ Hz, $J_{F1-F4} = 7.6$ Hz, F₁, F₄), -144.09 (ddt, $J_{F2-F1} = 25.1$ Hz, $J_{F2-F4} = 16.9$ Hz, J_{F2-H} and $J_{F2-3} = 7.8$ Hz, F₂, F₃).

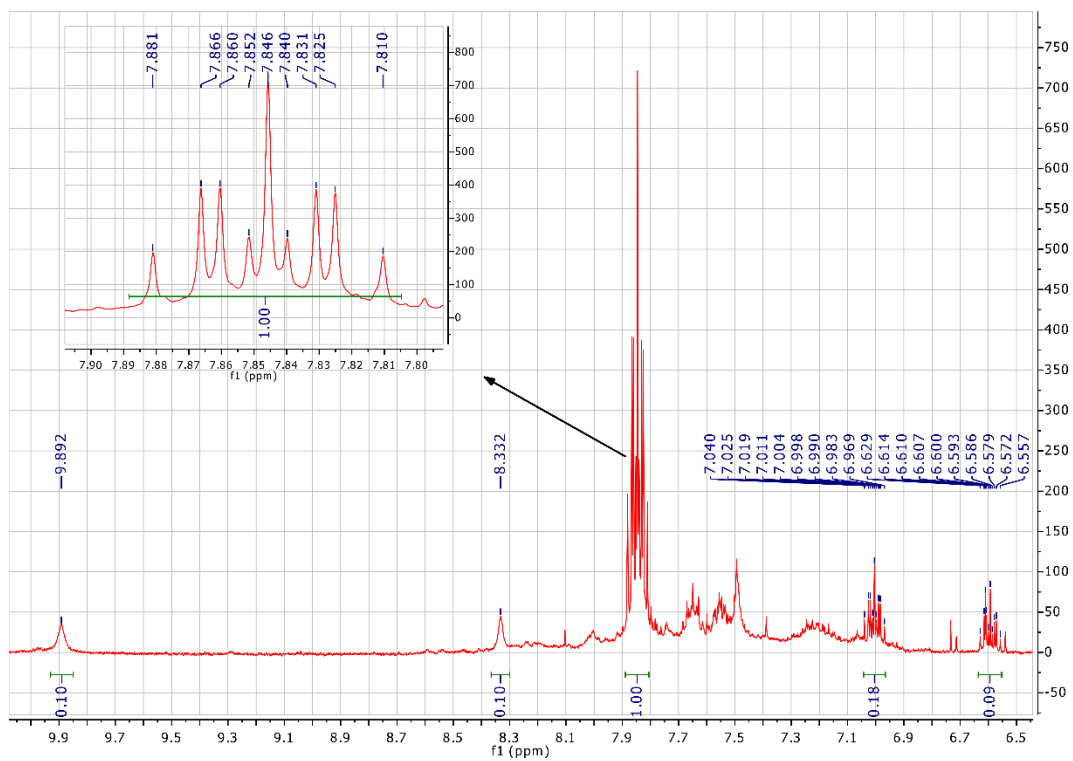


Fig. S9. ¹H NMR spectrum of PTFANI in deuterated acetone

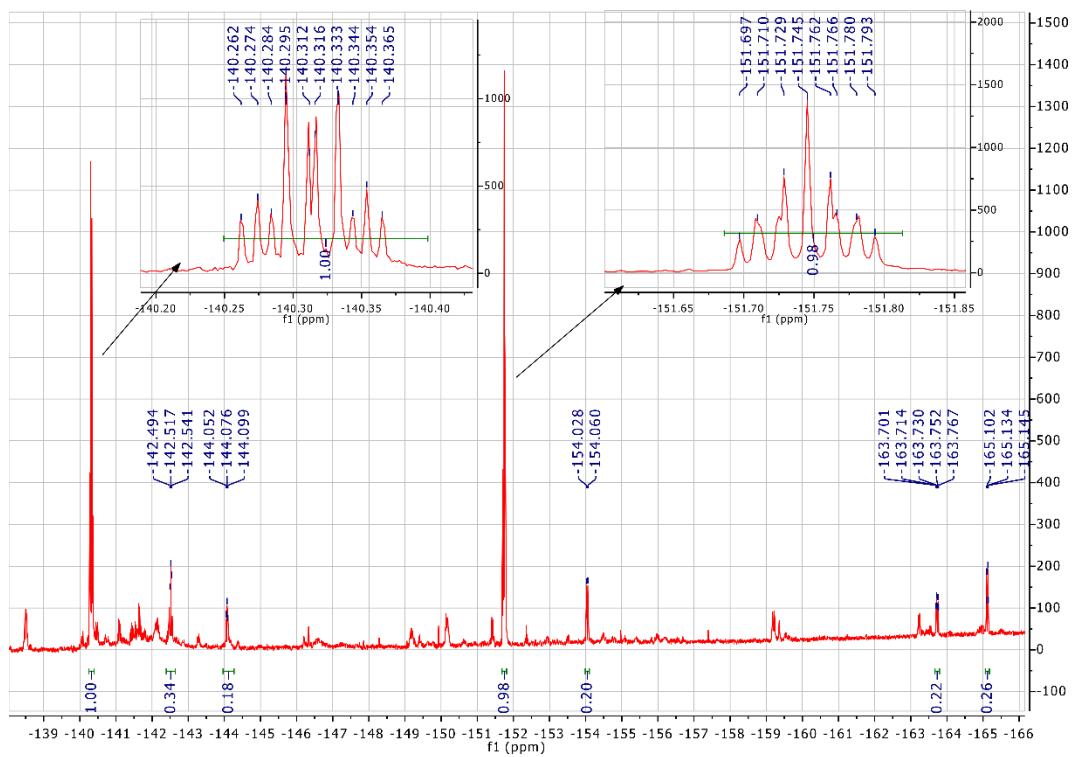


Fig. S10. ^{19}F NMR spectrum of PTFANI in deuterated acetone

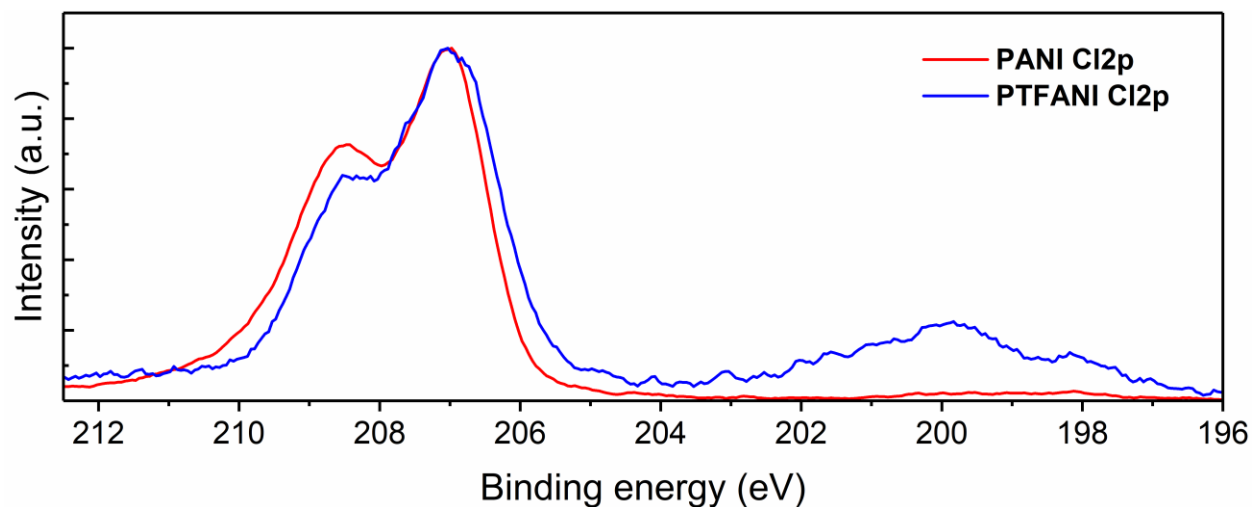


Fig. S11. XPS high resolution spectra of PTFANI and PANI Cl(1s)

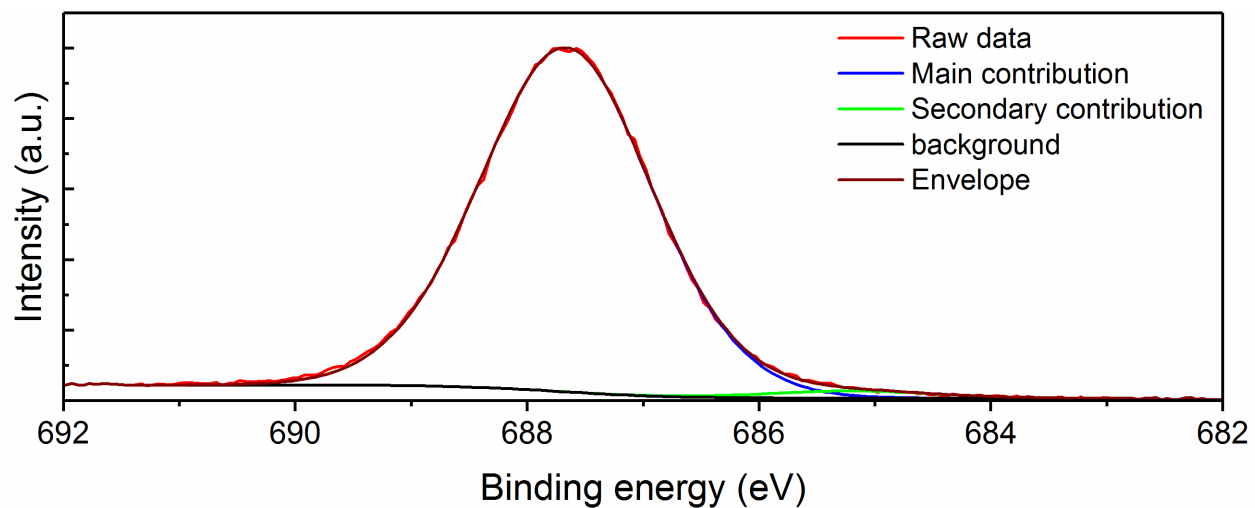


Fig. S12. XPS high resolution spectra of PTFANI F(1s)

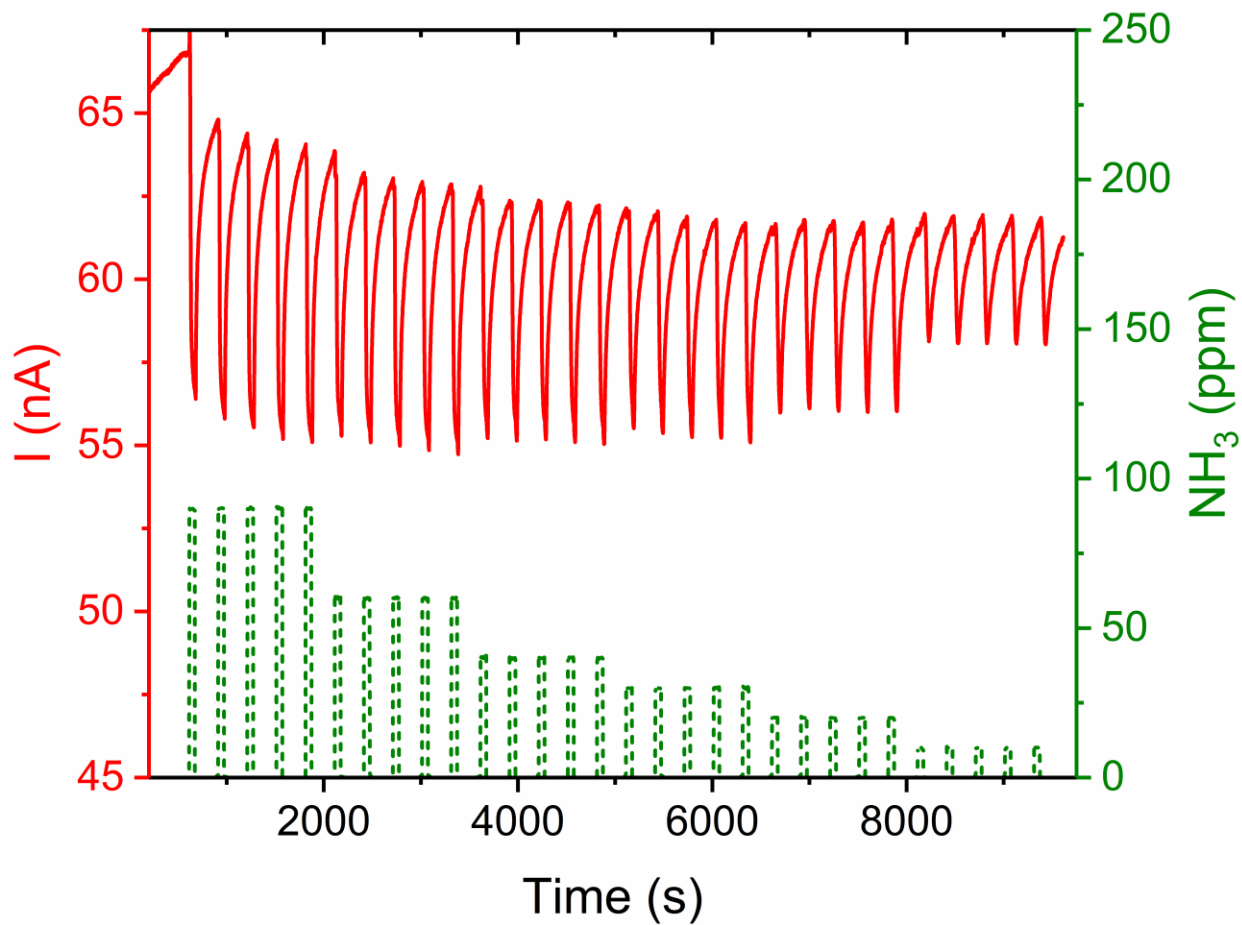


Fig. S13. Response of a PTFANI/LuPc₂/PTFANI heterojunction to NH₃ (90, 60, 40, 20 and 10 ppm), in air at 50 % RH, during exposure / recovery cycles (1 min / 4 min).