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Supplementary Materials

Gold electrodes functionalized by biosourced polyphosphine films for the sensitive detection of lead ions

Taha Chabbah [1,4], Houyem Abderrazak [1], Radhia Souissi [1], Patrice Saint-Martin [2], Herve Casabianca [2], Saber Chatti [1], Regis Mercier [3], Ilhem Rassas [2], Abdelhamid Errachid [2], Mohamed Hammami [1] and Nicole Jaffrezic-Renault [2,*]

[1] National Institute of Research and Physicochemical Analysis (INRAP), Biotechnopole of Sidi Thabet, 2020 Ariana, Tunisia; taha.chabbah@fst.utm.tn (T.C.); houyem.snani@yahoo.fr (H.A.); souissiradhia@yahoo.fr (R.S.); saberchatti2014@gmail.com (S.C.); mohamed.hammami@inrap.rnrt.tn (M.H.)

[2] University of Lyon, Institute of Analytical Sciences, UMR 5280, 5 Rue de la Doua, 69100 Villeurbanne, France; patrice.saint-martin@isa-lyon.fr (P.S.-M.); herve.casabianca@isa-lyon.fr (H.C.); ilhemras@hotmail.fr (I.R.); abdelhamid.errachid-el-salhi@univ-lyon1.fr (A.E.); nicole.jaffrezic@univ-lyon1.fr (N.J.-R.)

[3] University of Lyon, Institute of Polymer Materials, UMR 5223, 5 Rue V. Grignard, 69622 Villeurbanne Cedex, France; regis.mercier@univ-lyon1.fr

[4] University of Tunis El Manar, Faculty of Sciences, Farhat Hached Universitary campus, 1068 Tunis, Tunisia

* Correspondence: nicole.jaffrezic@univ-lyon1.fr

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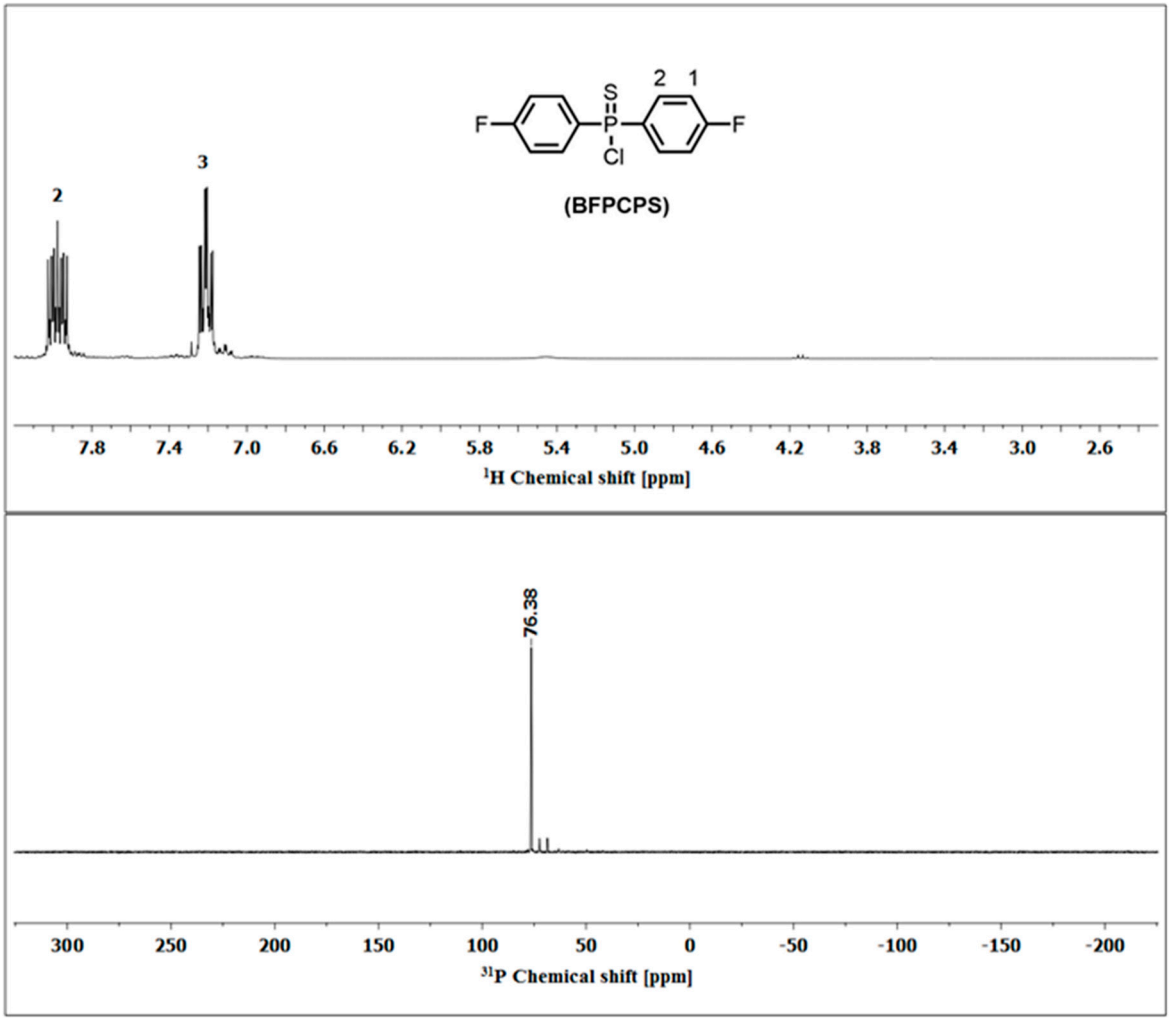
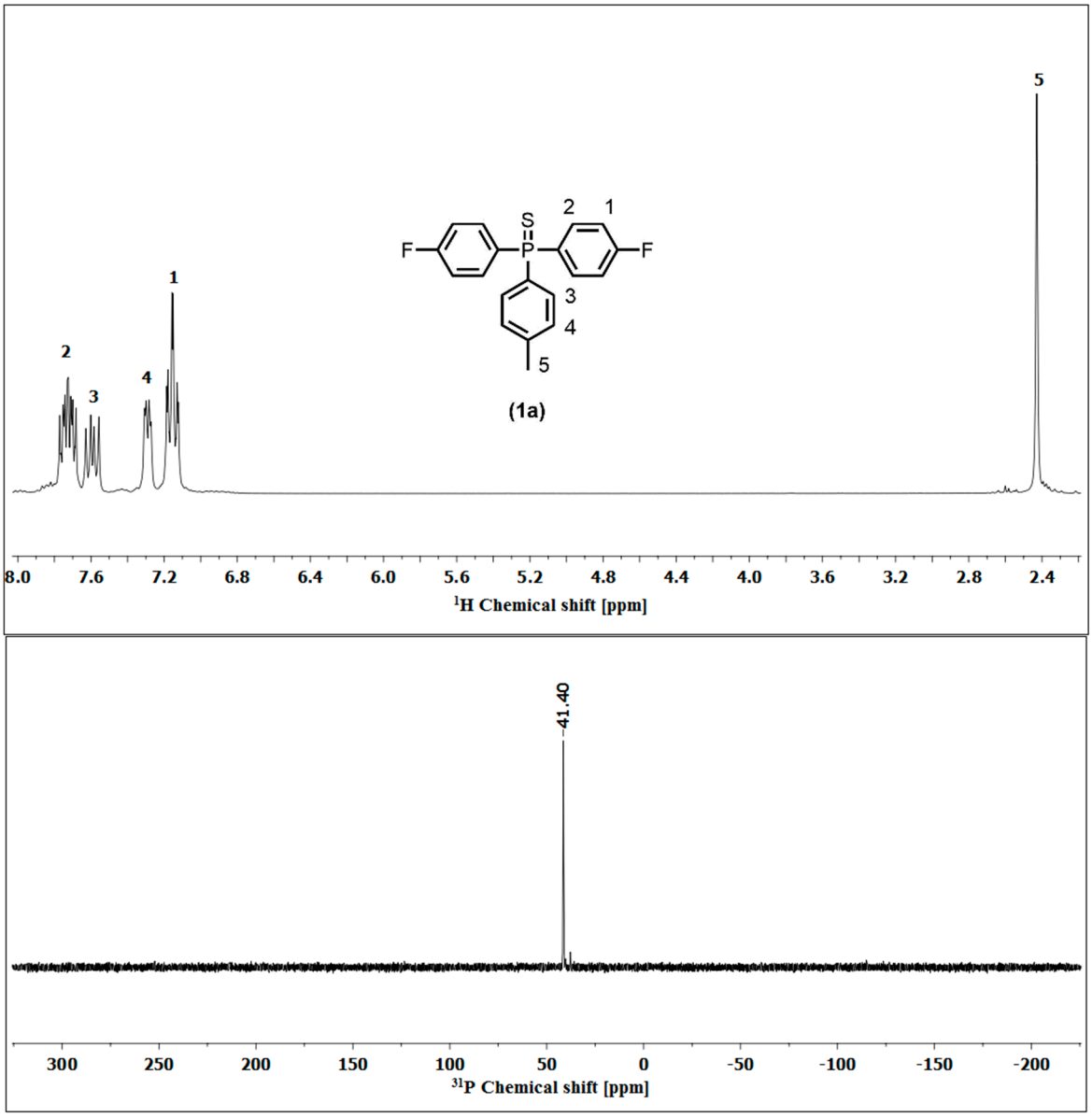
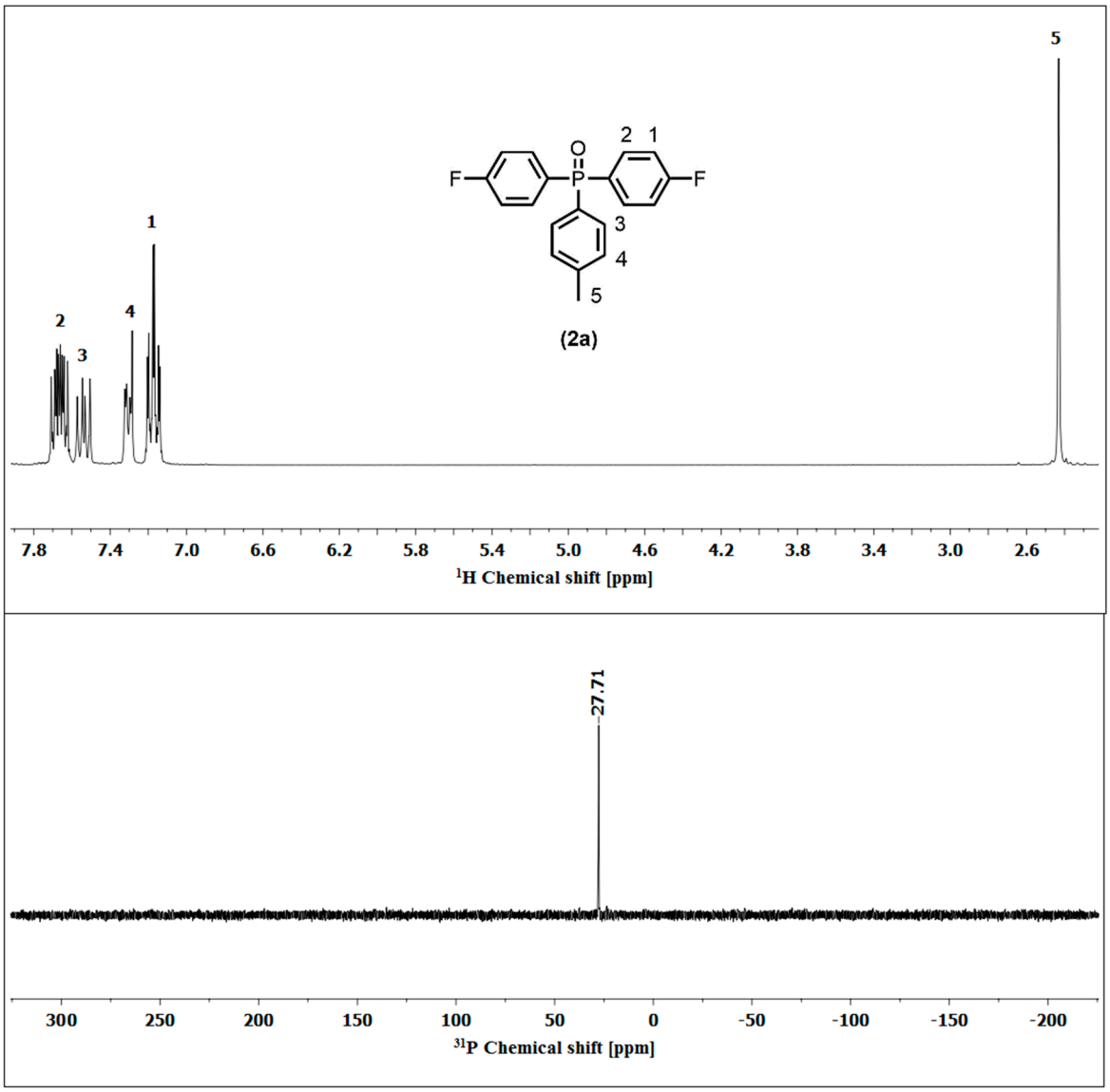


Figure S1. Representative NMR data of protons related to the chemical structures of synthesized monomers and polymers.

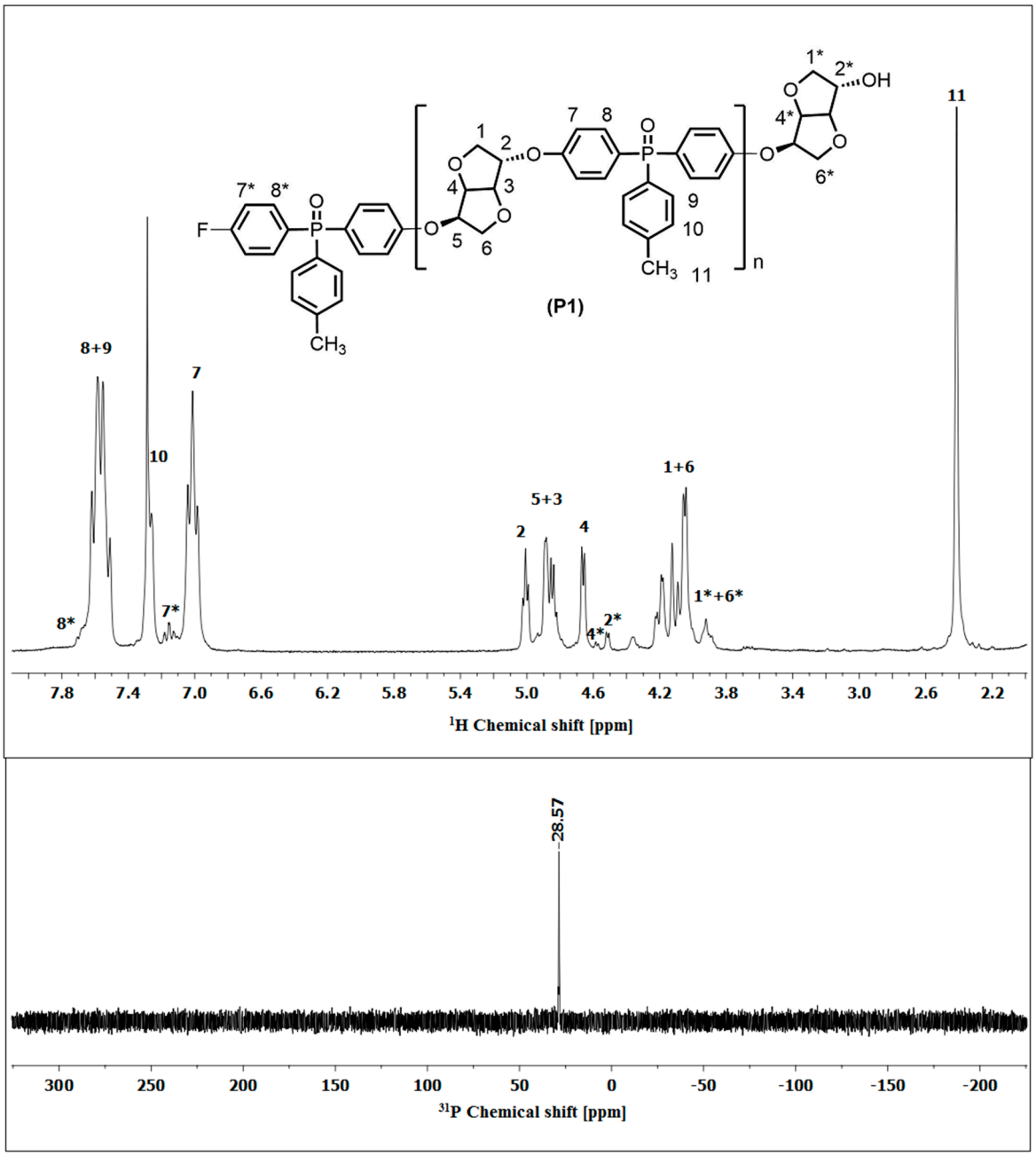
^{1}H NMR: (CDCl3) : δ (ppm) : 7.87 (m, 4H2) ; 7.11 (m, 4H1),^{19}F NMR: (CDCl3) : δ (ppm) : -105.07. ^{31}PNMR : (CDCl3) : δ (ppm) : 76.40.



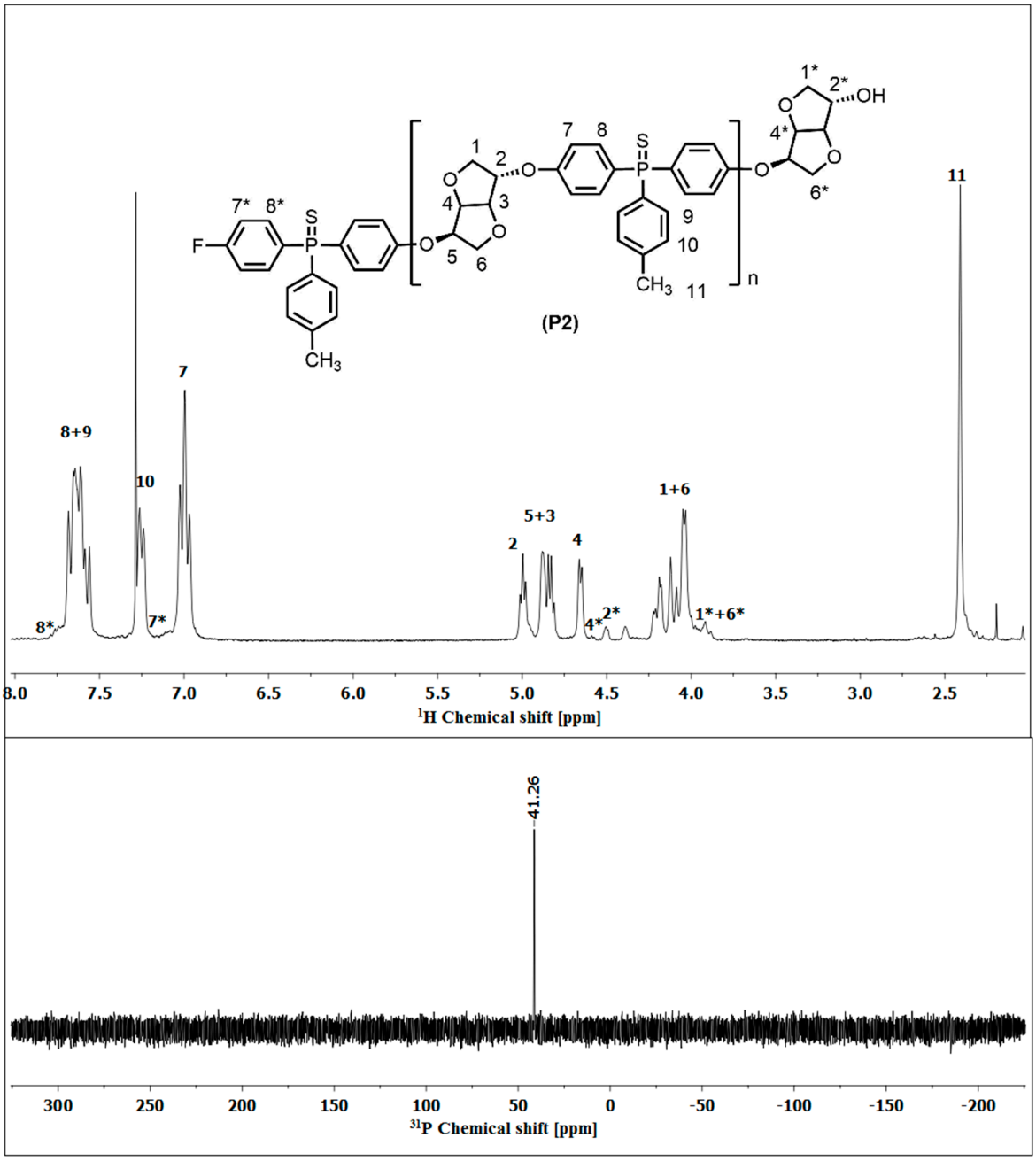
^{1}H NMR : (CDCl3) : δ (ppm) : 7.73 (m, 4H2) ; 7.60 (m, 2H3) ; 7.30 (m, 2H4) ; 7.16 (m, 4H1) ; 2.43 (s, 3H5).^{19}F NMR : (CDCl3) : δ (ppm) : -107.43.^{31}P NMR : (CDCl3) : δ (ppm) : 41.40.



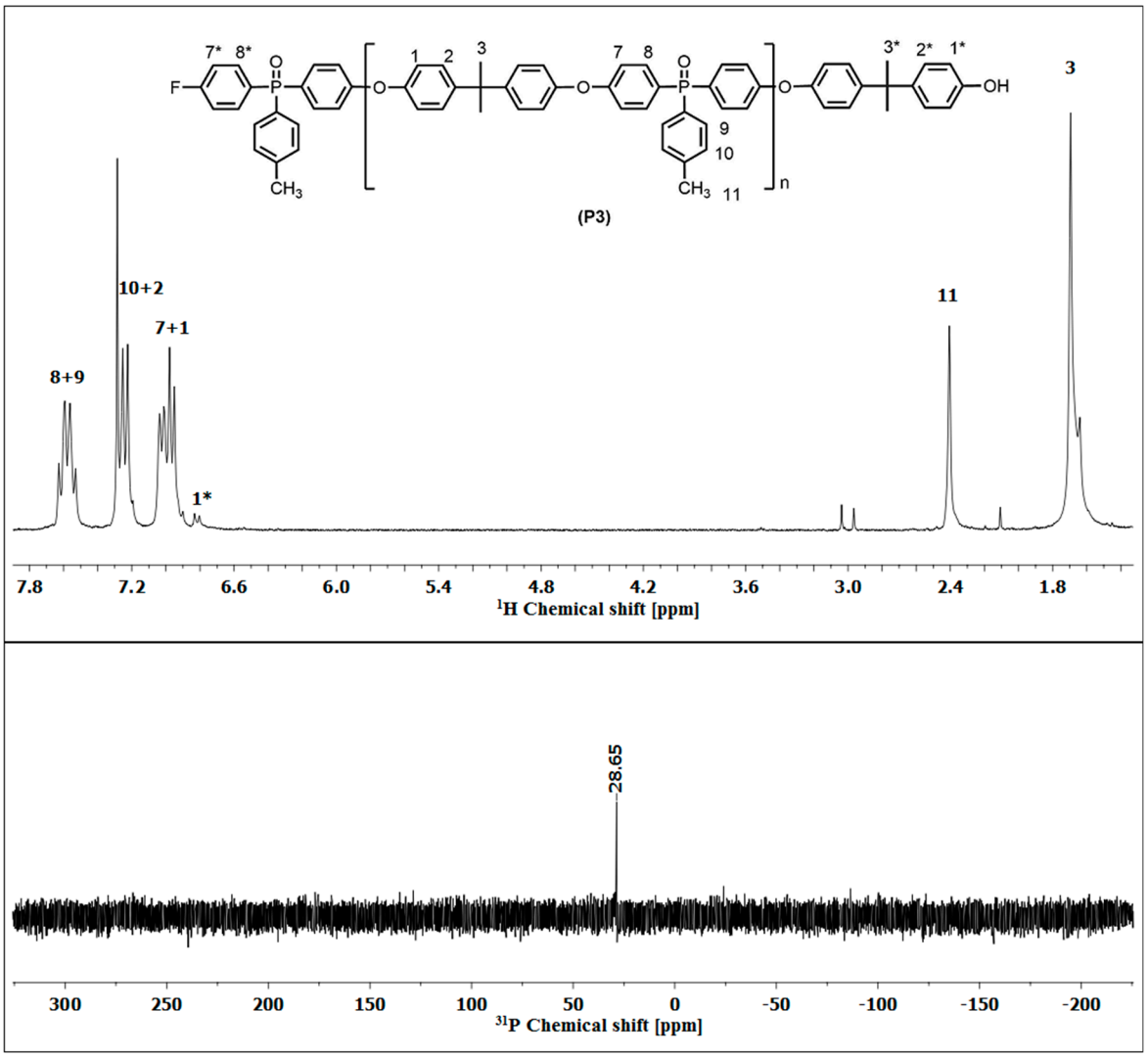
^{1}H NMR: ($CDCl_3$) : δ (ppm) : 7.66 (m, 4H2) ; 7.54 (m, 2H3) ; 7.31 (m, 2H4) ; 7.17 (m, 4H1) ; 2.43 (s, 3H5).^{19}F NMR: ($CDCl_3$): δ (ppm): -106.57. ^{31}P NMR: ($CDCl_3$): δ (ppm) : 27.71.



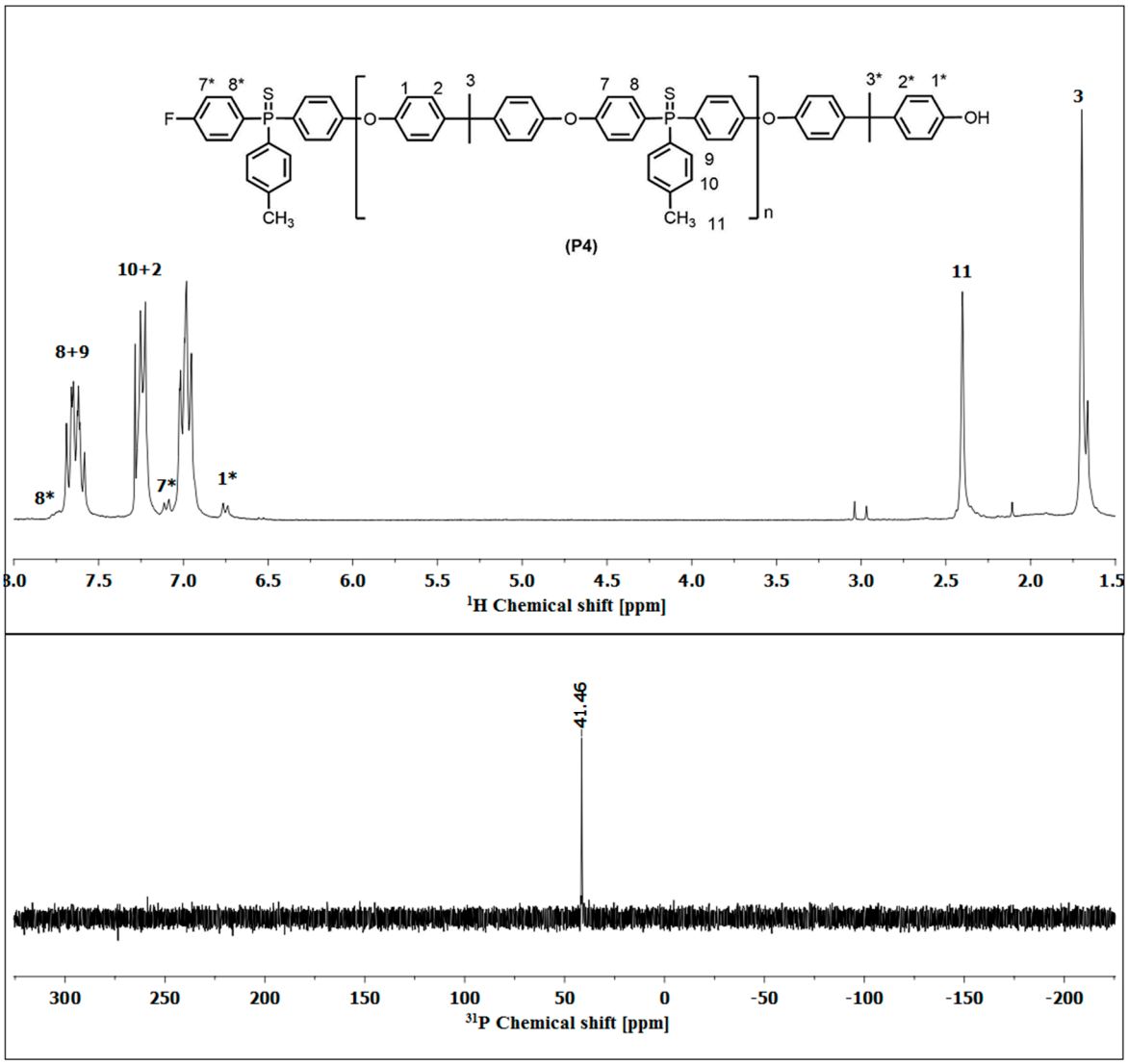
^{1}H NMR: ($CDCl_3$) : δ (ppm) : 7.62–7.51 (m, 6H, H8 et H9), 7.28–7.26 (m, 2H, H10), 7.04–6.98 (m, 4H, H7), 5.02-4.99 (m, 1H, H2), 4.89-4.82 (m, 2H, H5 et H3), 4.67–4.65 (m, 1H, H4) 4.05-4.04 (m, 4H, H1 et H6), 2.41 (s, 3H, H11).^{31}P NMR: ($CDCl_3$) : δ (ppm) : 28.57



^{1}H NMR: ($CDCl_3$) : δ (ppm) : 7.68–7.56 (m, 6H, H8 et H9), 7.26–7.24 (m, 2H, H10), 7.02–6.97 (m, 4H, H7), 5.02-4.98 (m, 1H, H2), 4.88-4.81 (m, 2H, H5 et H3), 4.66–4.65 (m, 1H, H4), 4.05-4.03 (m, 4H, H1 et H6), 2.41 (s, 3H, H11). ^{31}P NMR: ($CDCl_3$) : δ (ppm) : 41.26.



^{1}H NMR: ($CDCl_3$) : δ (ppm) : 7.63–7.53 (m, 6H, H8 et H9), 7.25–7.22 (m, 6H, H10 et H2), 7.04–6.95 (m, 8H, H7 et H1), 2.41 (s, 3H, H11), 1.69 (s, 6H, H3).^{31}P NMR : ($CDCl_3$) : δ (ppm) : 28.65



^{1}HNMR : ($CDCl_3$) : δ (ppm) : 7.69–7.58 (m, 6H, H8 et H9), 7.25–7.22 (m, 6H, H10 et H2), 7.02–6.95 (m, 8H, H7 et H1), 2.40 (s, 3H, H11), 1.70 (s, 6H, H3).^{31}P NMR : ($CDCl_3$) : δ (ppm) : 41.46

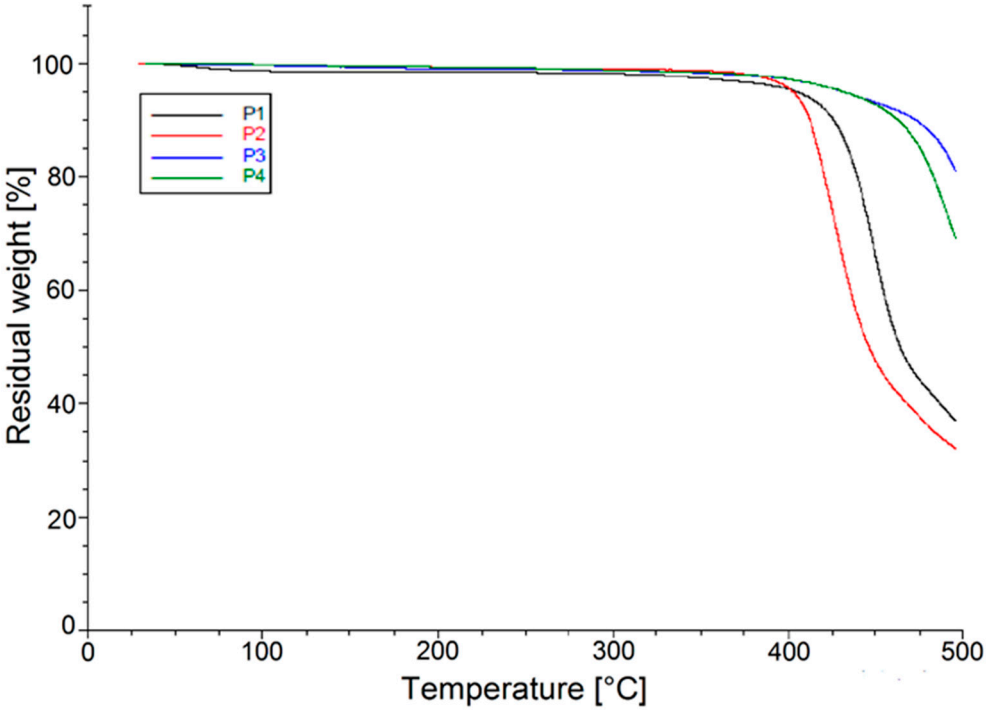


Figure S2. TGA thermograms of resulting polymers P1-P4 under nitrogen.

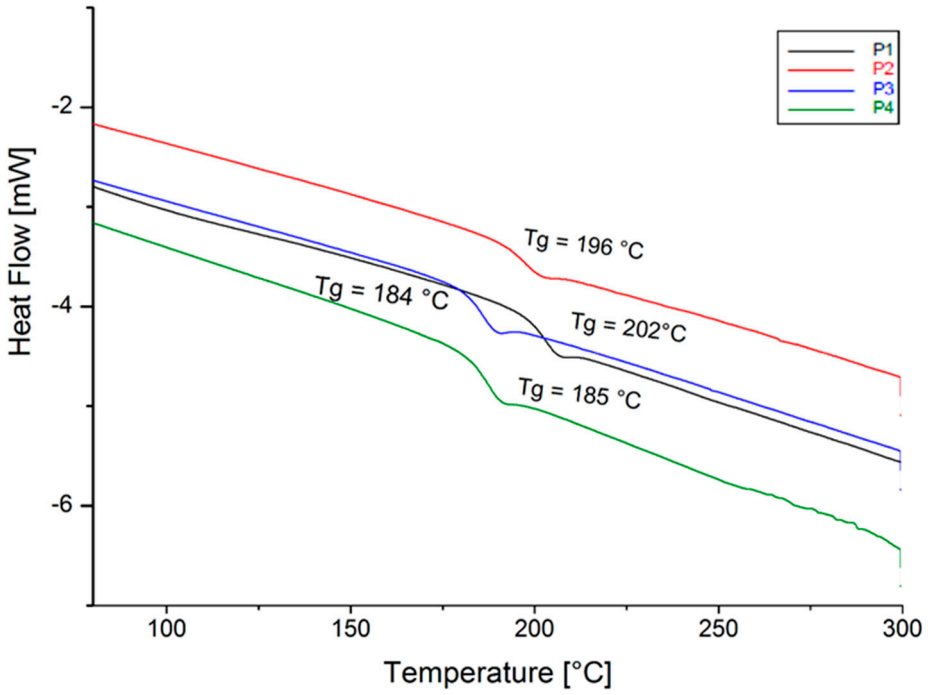


Figure S3. DSC heating curves of resulting polymers P1-P4 under nitrogen.

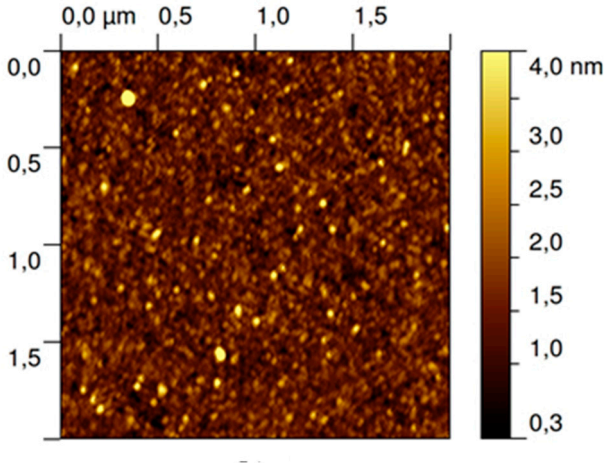


Figure S4. AFM image of the P1-modified gold electrode.

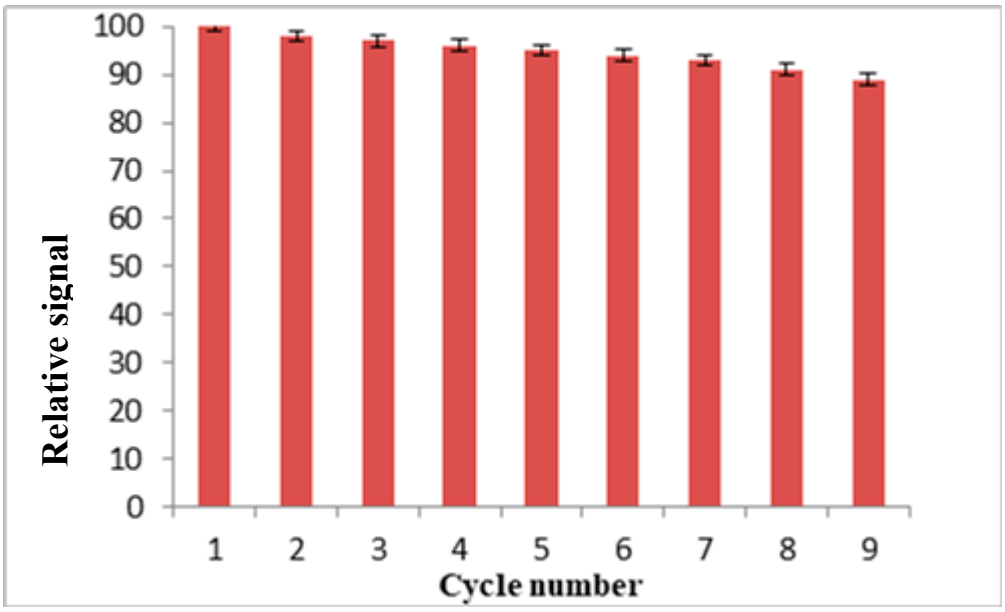


Figure S5. Relative variation of the Pb^{2+} signal after one adsorption-desorption cycle every week.