Supporting Information for:

Tuning of Resistive Memory Switching in Electropolymerized Metallopolymeric films

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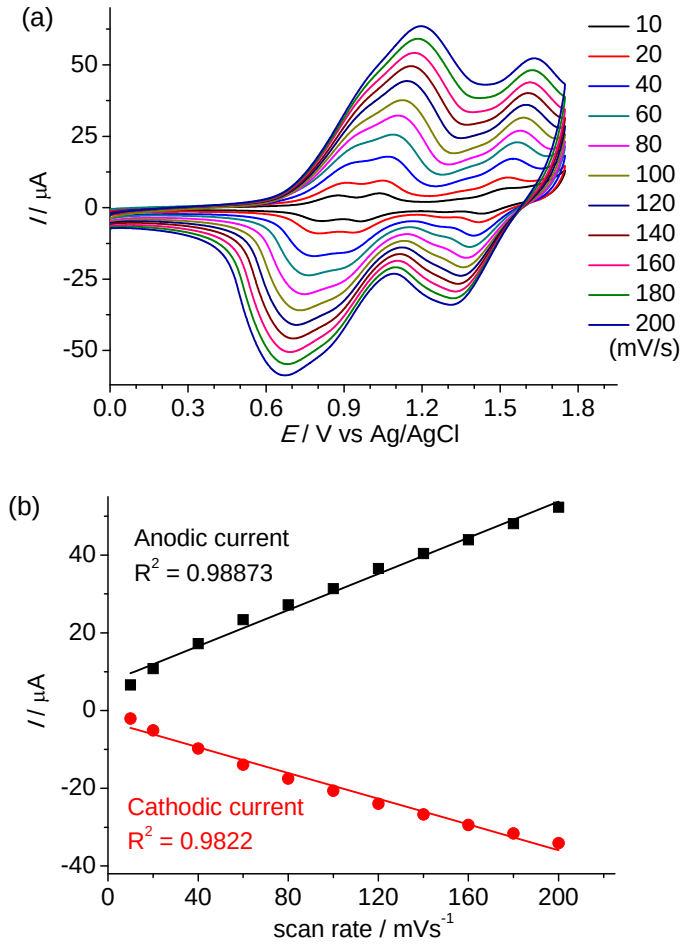


Figure S1. (a) CVs of the poly-$\mathbf{1}^{4+}$/Pt film at different scan rate. (b) The linear relationship of the currents of the redox wave at +1.44 V versus the scan rate.

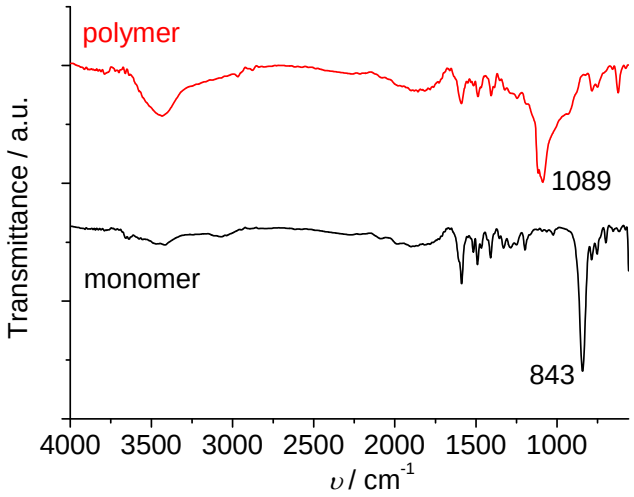


Figure S2. FTIR spectra of **1**$(PF_6)_4$ (black curve) and poly-$\mathbf{1}^{4+}$ (red curve).

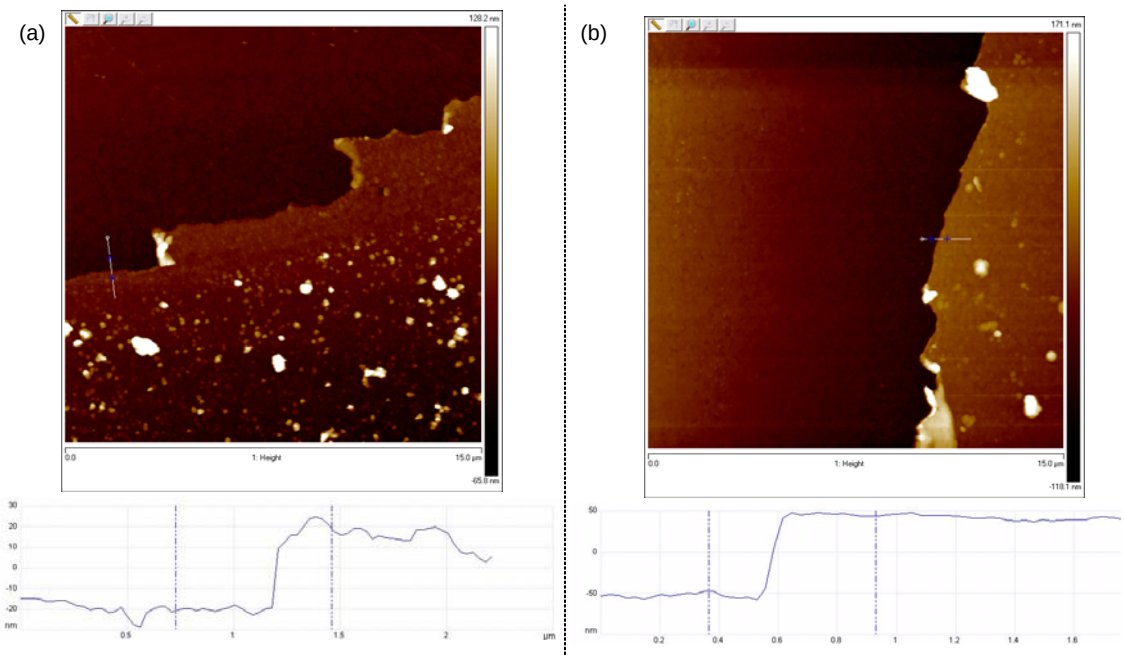
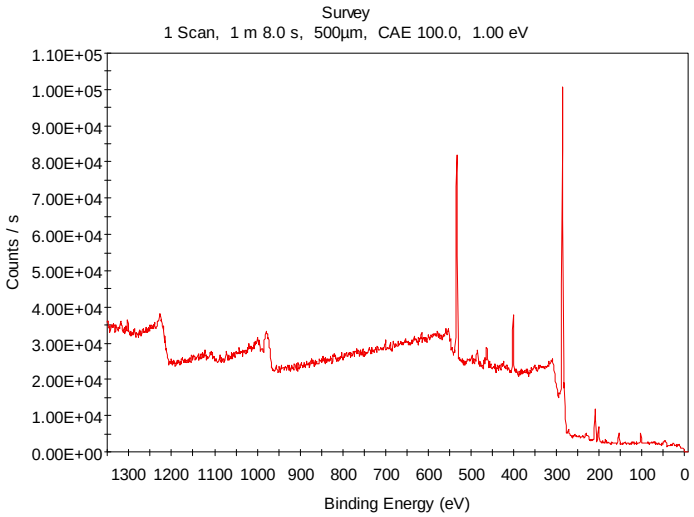
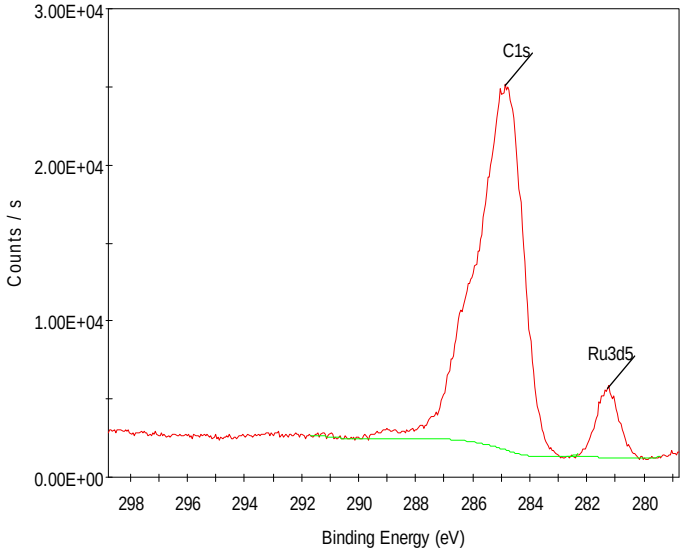


Figure S3. Estimating the thickness of the poly-$\mathbf{1}^{4+}$/ITO film by measuring the step height produced by scanning across a scratching edge using AFM. (a) 40 nm. (b) 100 nm.

(a):



(b):



(c):

	Binding energy (eV)	Atomic%
O 1s	532.1	16.1
N 1s	400.1	7.25
C 1s	284.88	69.77
Ru $3d_5$	281.28	0.73
Cl 2p	207.46	4.03
Si 2p	102.05	2.12

Figure S4. XPS survey spectra of poly-**1**$^{4+}$/ITO (black curve) film. (a) Survey scan. (b) Cl and Ru scan. (c) Atomic composition.

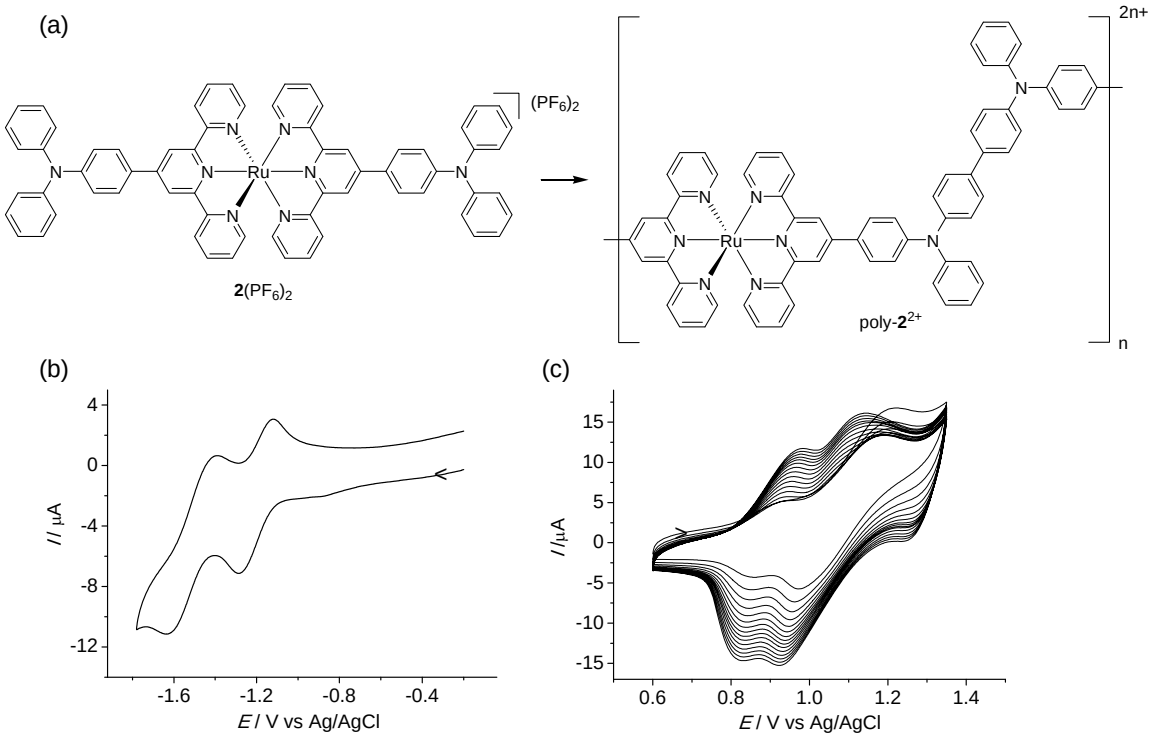


Figure S5. (a) Synthesis of poly-$\mathbf{2}^{2+}$ via the oxidative electropolymerization of $\mathbf{2}(PF_6)_2$. (b) Cathodic CV of $\mathbf{2}(PF_6)_2$ at a Pt disk electrode (d = 2 mm) in 0.1 M Bu_4NClO_4/CH_2Cl_2. (c) CVs recorded during repeated potential scan between +0.60 and +1.30 V, which indicates that the electropolymerization of $\mathbf{2}(PF_6)_2$ occurred smoothly.

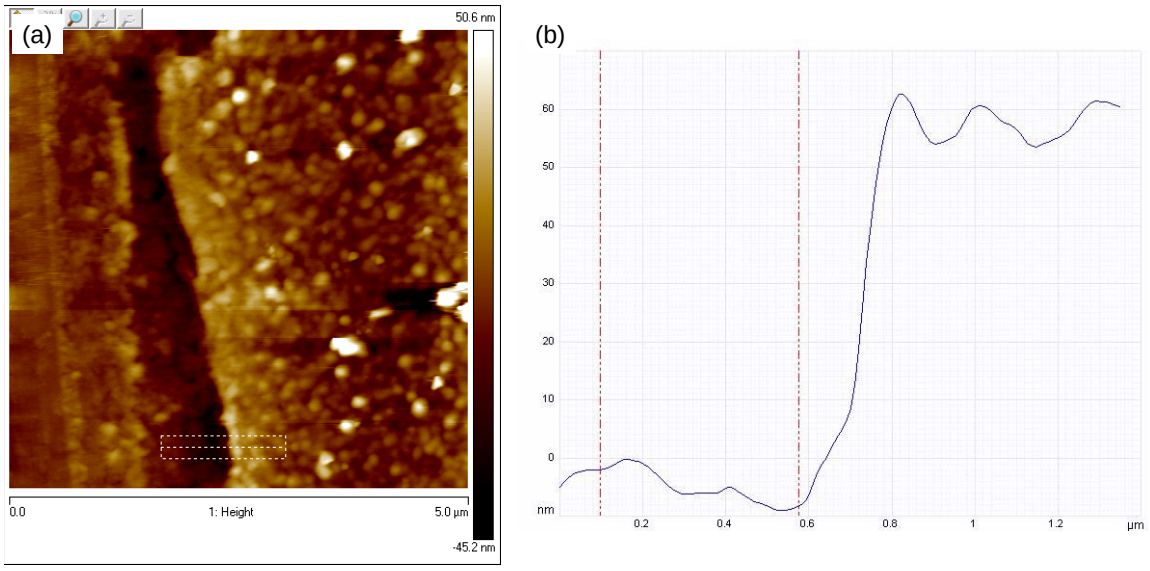
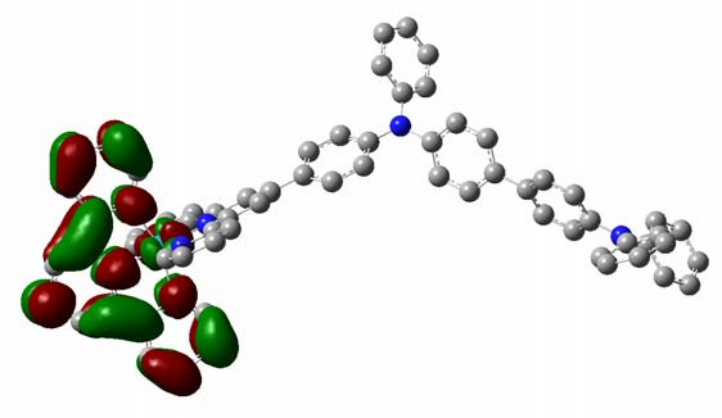
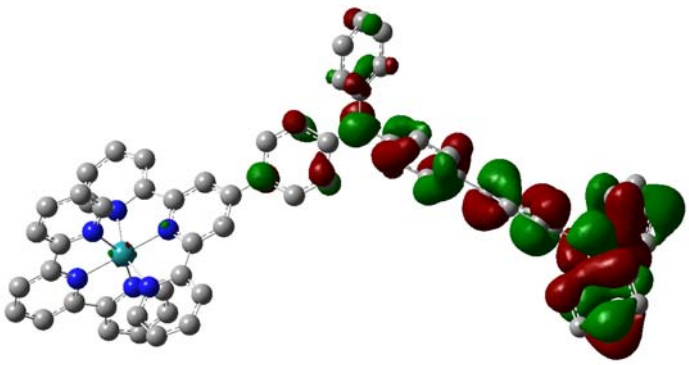


Figure S6. (a) AFM height image of poly-$\mathbf{2}^{2+}$/ITO film and (b) estimating the thickness by a scratching method.



LUMO (-3.03 eV)



HOMO (-5.18 eV)

Figure S7. Isodensity plots of the frontier molecular orbitals of a monoruthenium-tetraphenylbenzidine basic structural component of poly-$\mathbf{2}^{2+}$. DFT methods: B3LYP/LANL2DZ/6-31-G*/CPCM. Eigenvalues in eV are shown in the parenthesis for each energy level. The HOMO-LUMO gap is 2.15 eV.

Full list of ref 22:

Frisch, M. J.; Trucks, G. W.; Schlegel, H. B.; Scuseria, G. E.; Robb, M. A.; Cheeseman, J. R.; Montgomery, J. A.; Vreven, Jr. T.; Kudin, K. N.; Burant, J. C.; Millam, J. M.; Iyengar, S. S.; Tomasi, J.; Barone, V.; Mennucci, B.; Cossi, M.; Scalmani, G.; Rega, N.; Petersson, G. A.; Nakatsuji, H.; Hada, M.; Ehara, M.; Toyota, K.; Fukuda, R.; Hasegawa, J.; Ishida, M.; Nakajima, T.; Honda, Y.; Kitao, O.; Nakai, H.; Klene, M.; Li, X.; Knox, J. E.; Hratchian, H. P.; Cross, J. B.; Adamo, C.; Jaramillo, J.; Gomperts, R.; Stratmann, R. E.; Yazyev, O.; Austin, A. J.; Cammi, R.; Pomelli, C.; Ochterski, J. W.; Ayala, P. Y.; Morokuma, K.; Voth, G. A.; Salvador, P.; Dannenberg, J. J.; Zakrzewski, V. G.; Dapprich, S.; Daniels, A. D.; Strain, M. C.; Farkas, O.; Malick, D. K.; Rabuck, A. D.; Raghavachari, K.; Foresman, J. B.; Ortiz, J. V.; Cui, Q.; Baboul, A. G.; Clifford, S.; Cioslowski, J.; Stefanov, B. B.; Liu, G.; Liashenko, A.; Piskorz, P.; Komaromi, I.; Martin, R. L.; Fox, D. J.; Keith, T.; Al-Laham, M. A.; Peng, C. Y.; Nanayakkara, A.; Challacombe, M.; Gill, P. M. W.; Johnson, B.; Chen, W.; Wong, M. W.; Gonzalez, C.; Pople, J. A. Gaussian 09, revision A.2; Gaussian, Inc.: Wallingford CT, 2009.

Cartesian coordinates of the DFT-optimized diruthenium-bistriphenylamine structural component of poly-**1**$^{4+}$:

Charge = 4; multiplicity=1

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N	-2.46744029	6.76266495	10.97054204
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N	-4.69045373	4.78957688	11.59694005
N	-3.64652940	4.31708228	9.23898618
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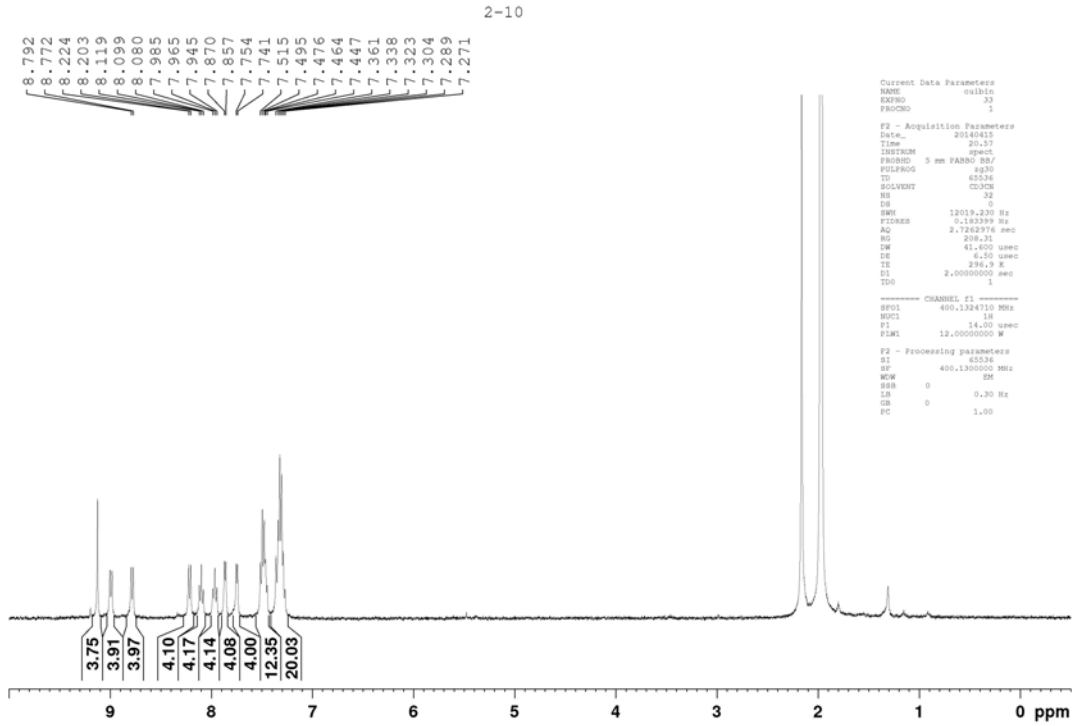
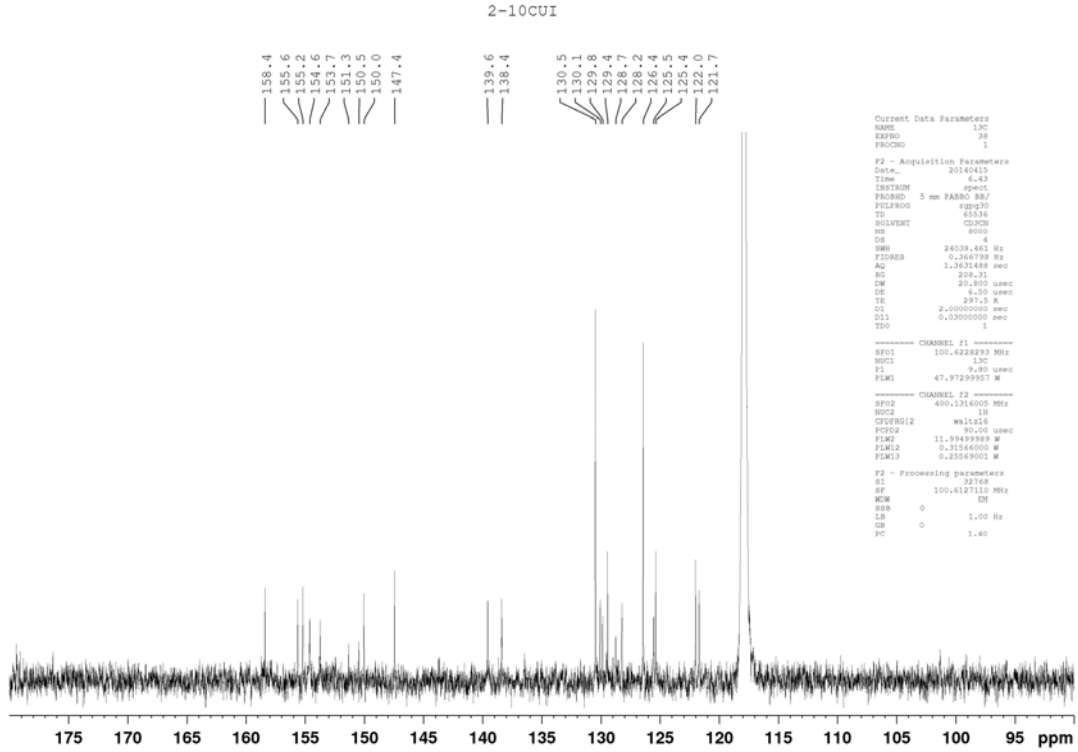
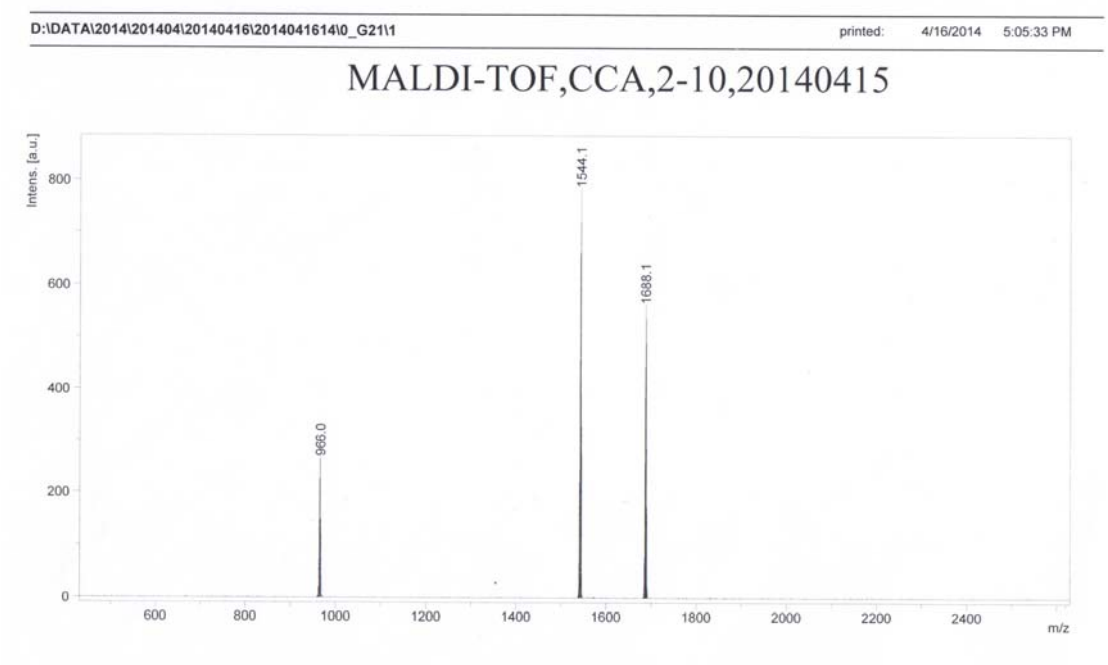
^{1}H NMR spectrum of **1**$(PF_6)_4$ in CD_3CN:



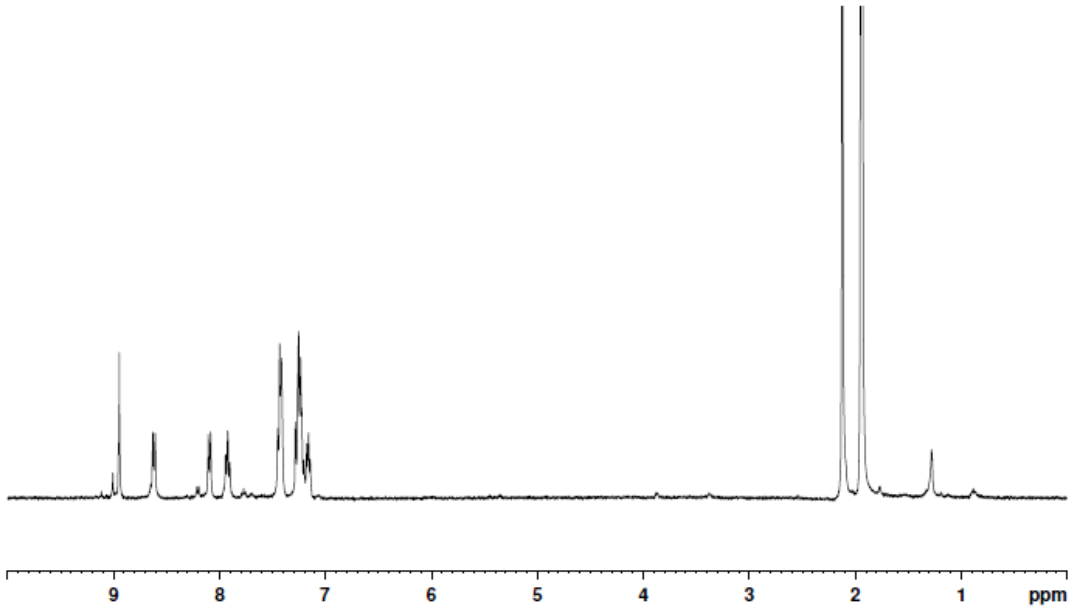
^{13}C NMR spectrum of **1**$(PF_6)_4$ in CD_3CN:



MALDI-TOF mass spectrum of **1**$(PF_6)_4$:



^{1}H NMR spectrum of **2**$(PF_6)_2$ in CD_3CN:



MALDI-TOF mass spectrum of **2**$(PF_6)_2$: