Electronic Supplementary Material (ESI) for Analyst.
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Supplementary Information

Label-free electrochemical immunosensor based on ionic organic molecule and chitosan-stabilized gold nanoparticles for the detection of cardiac troponin T

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Synthesis and characterization of ionic organic molecule I-Py

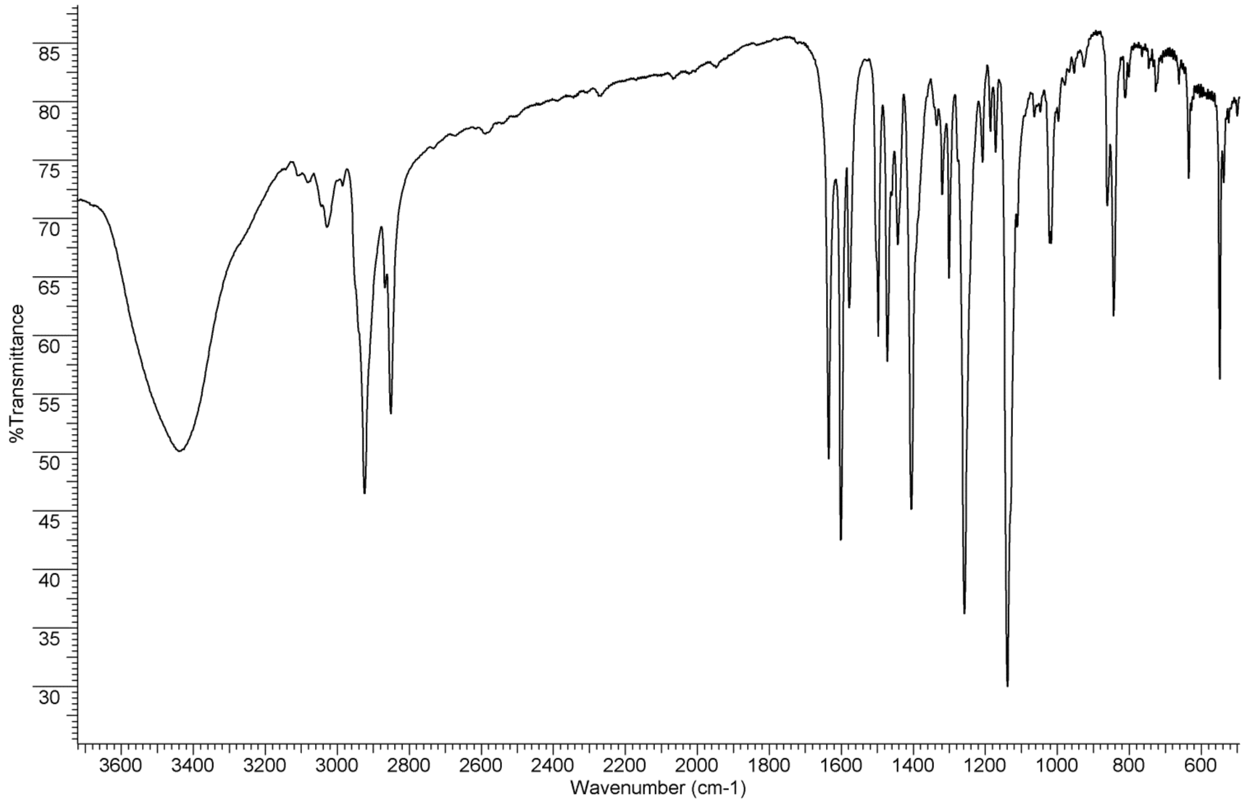

Fig. S1. IR spectrum for the ionic product **I-Py** in KBr.

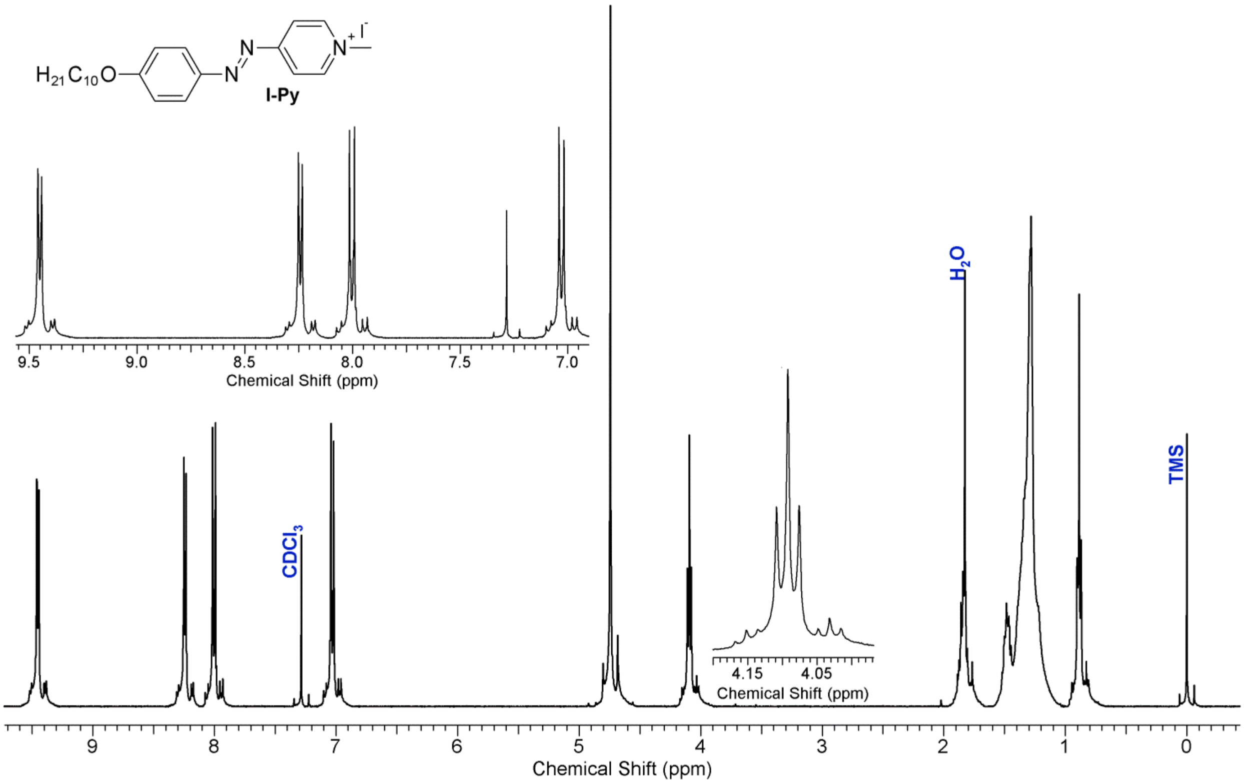

Fig. S2. ^1H NMR (400 MHz) spectrum for the ionic product **I-Py** in $CDCl_3$.

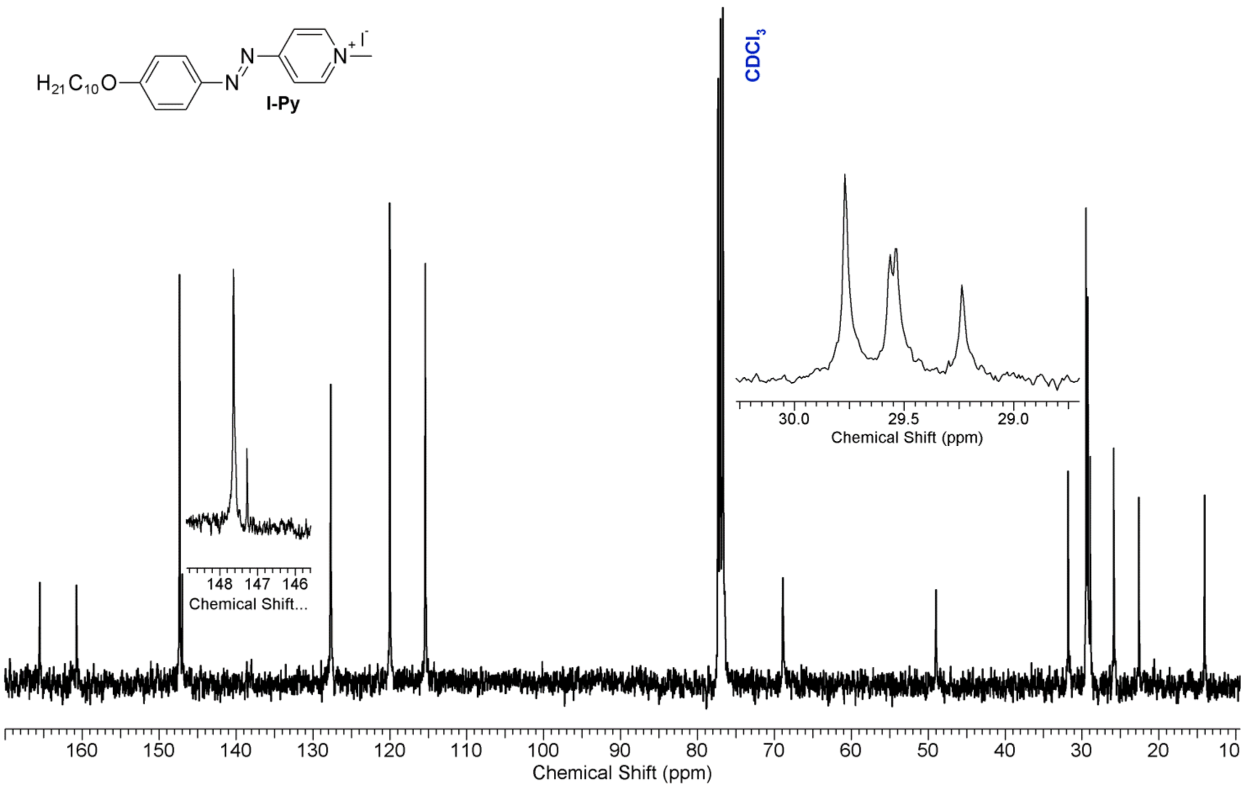

Fig. S3. ^{13}C NMR (100.6 MHz) spectrum for the ionic product **I-Py** in $CDCl_3$.

Thermal Characterization of I-Py

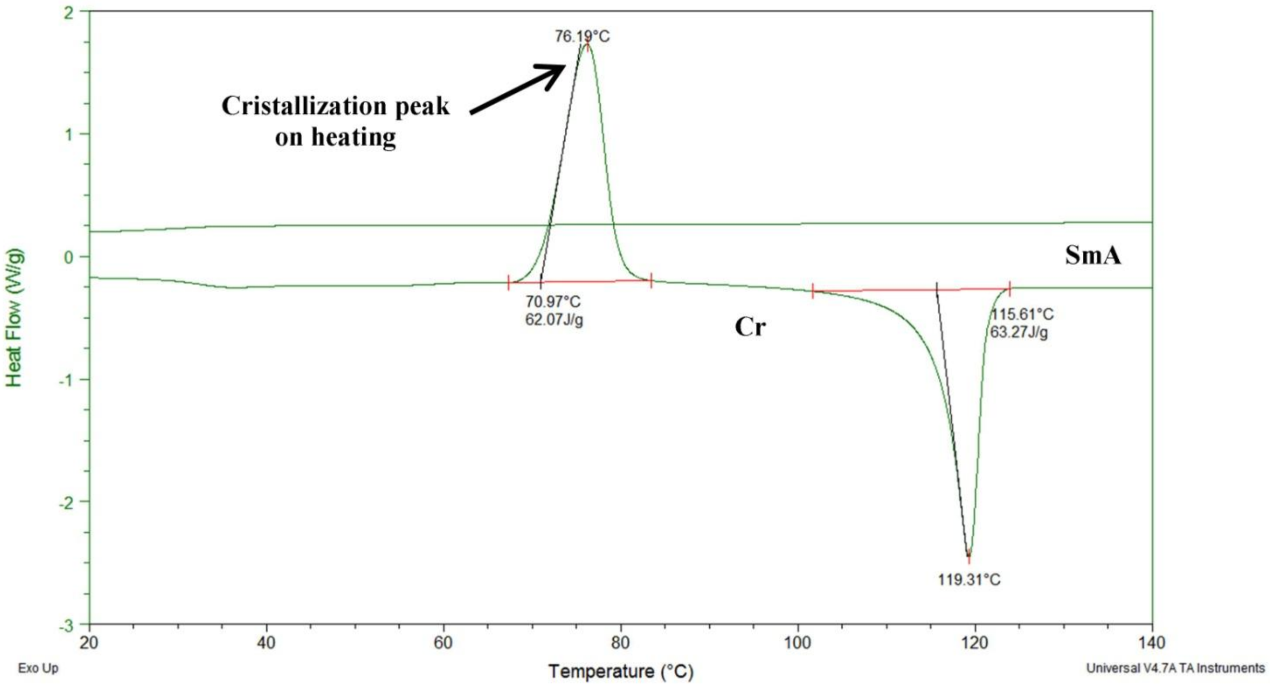

Fig. S4. Thermal transitions for the compound **I-Py** determined by DSC using a heating/cooling rate of 10 °C min^{-1} and N_2 flow (50 mL min^{-1}). The curves correspond to the first cooling and to the second heating scans.

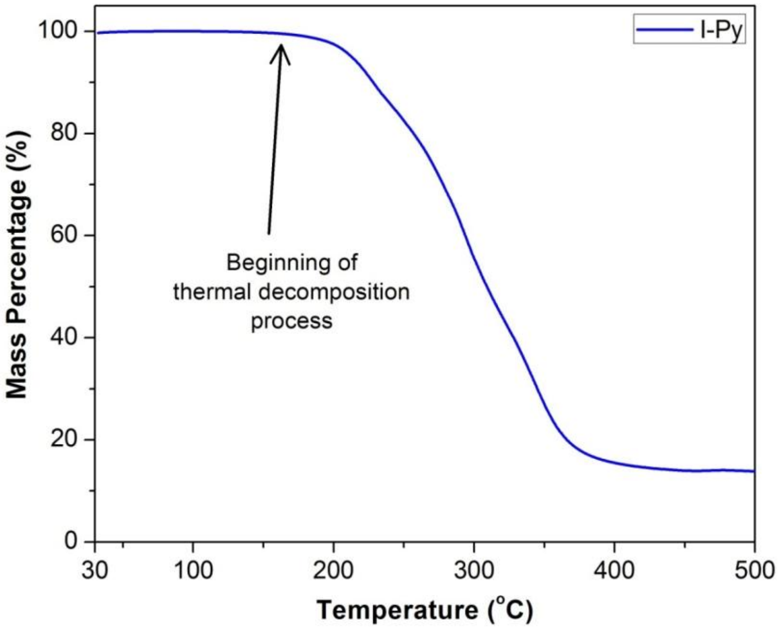

Fig. S5. Thermogravimetric analysis (TGA) plot for the ionic product **I-Py** under N_2 flow (20 mL min^{-1}) with a heating rate of 10 °C min^{-1}.

Electrochemical behavior of ionic organic molecule I-Py

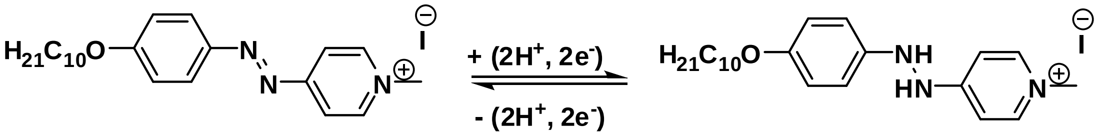

Fig. S6. Proposed chemical equation for the redox process of I-Py.

Figure S7-A shows the influence of the scan rate (ν) on the voltammetric profile for the I-Py modified electrode in phosphate buffer solution (pH 7.0, 0.1 mol L^{-1}). The scan rate was varied from 10 to 300 mV s^{-1}. The reaction is quasi-reversible because the potentials shifted with increasing scan rate. In addition, the cathodic current-i_{pc} /anodic current-i_{pa} ratio deviated slightly from 1.0. The currents of both peaks changed linearly with the square root of the scan rate (Fig. S7-B). The corresponding linear regression equations are i_{pa} / µA = -1.09 + 0.65 $v^{1/2}$ / (mV s^{-1})$^{1/2}$ (r^2 = 0.998) and i_{pc}/ µA = 1,47 - 0,87 $v^{1/2}$ / (mV s^{-1})$^{1/2}$ (r^2 = 0.990). These results indicate that the redox reaction of I-Py is a diffusion-controlled process. Moreover, the plot of log i_p *vs.* log *v* (Fig. S7-C) exhibited a slope of 0.65 for the oxidation reaction and 0.87 for the reduction reaction, clearly indicating that the current for both reactions was diffusion-controlled with a contribution from adsorption.

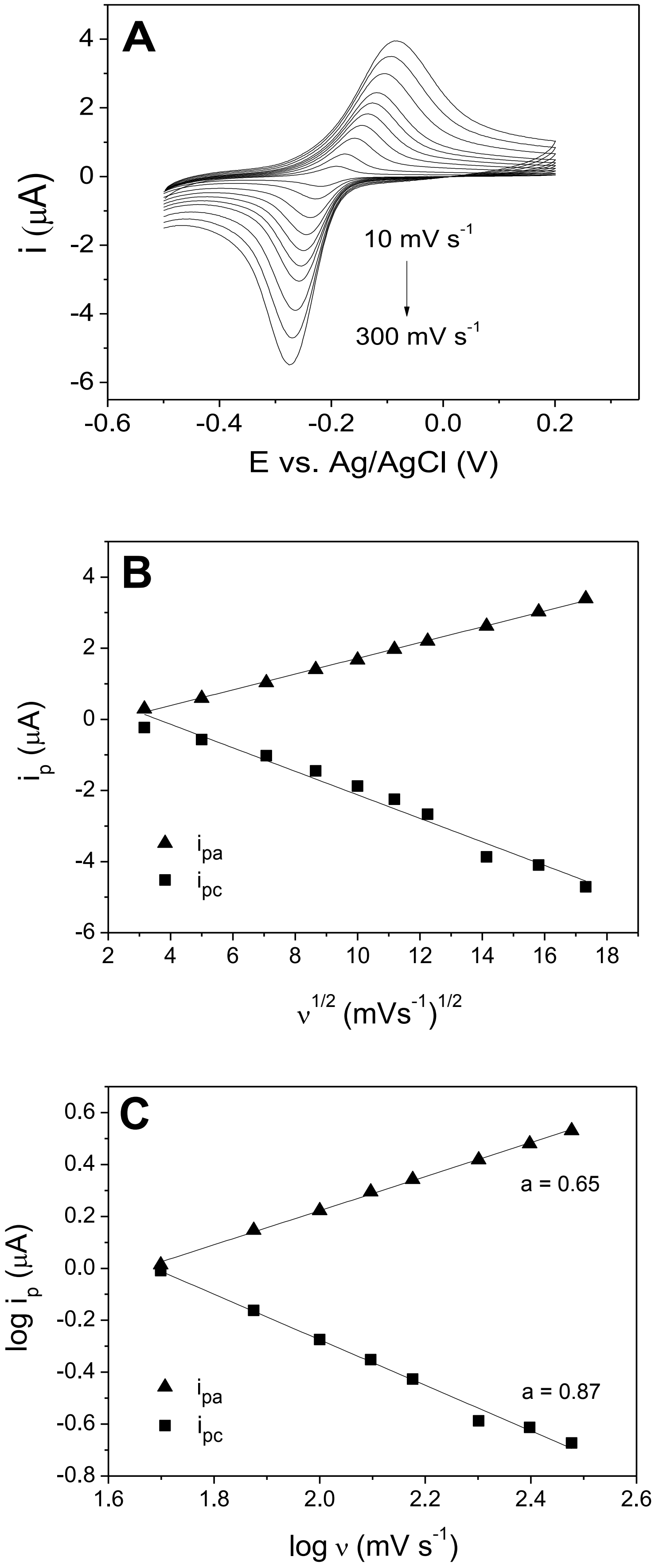

Fig. S7. (A) Cyclic voltammograms for I-Py sensor in 0.1 mol L^{-1} phosphate buffer (pH 7.0), v = 10 a 300 mV s^{-1}; (B) plot i_p *vs.* $v^{1/2}$; (C) plot log i_p *vs.* log v.

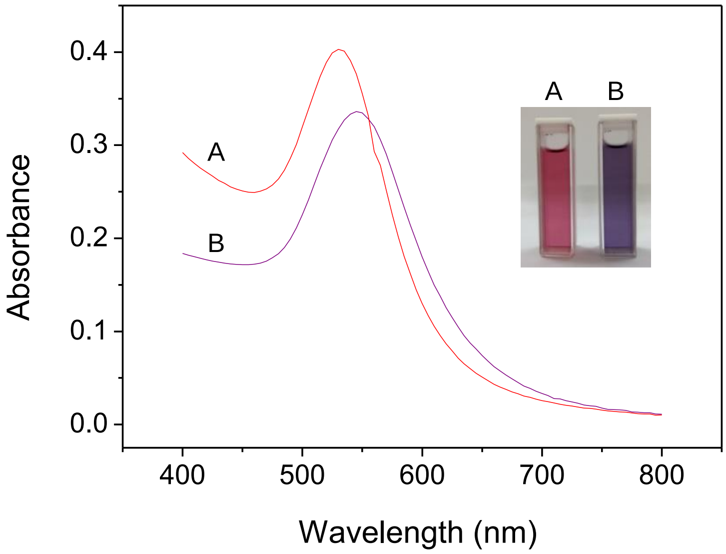

Fig. S8. UV-vis spectra of the CTS-stabilized AuNP (A) before and (B) after addition of anti-cTnT.