Supporting Information

High water-soluble Phenothiazine-based quaternary ammonium salts organic cathode materials for organic flow batteries

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Figure S1

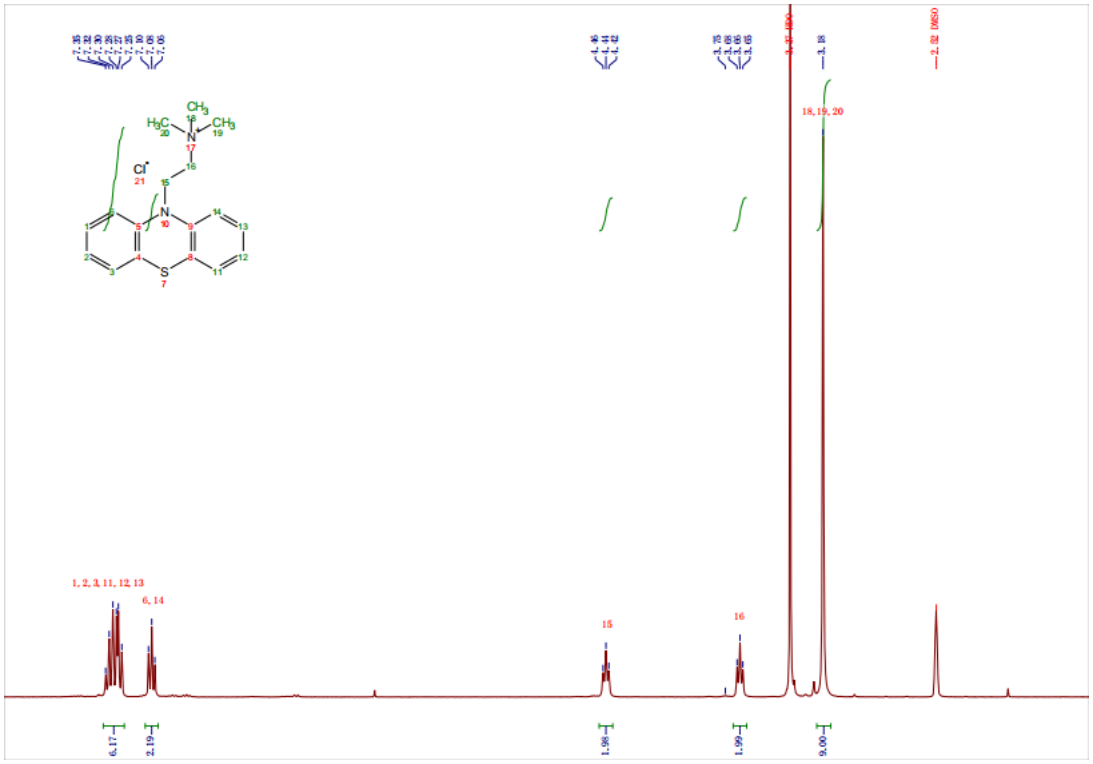


Figure S1-1 ^{1}H NMR Spectrum of TMEtAPtzCl.

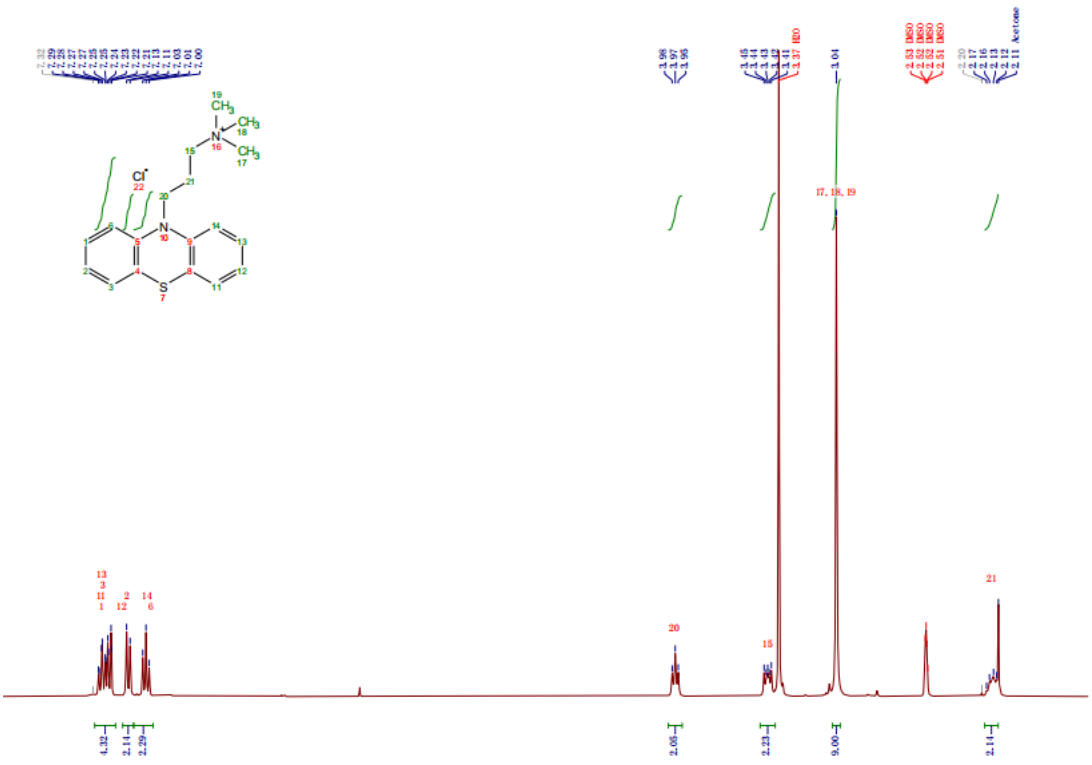


Figure S1-2 ^{1}H NMR Spectrum of TMPrAPtzCl.

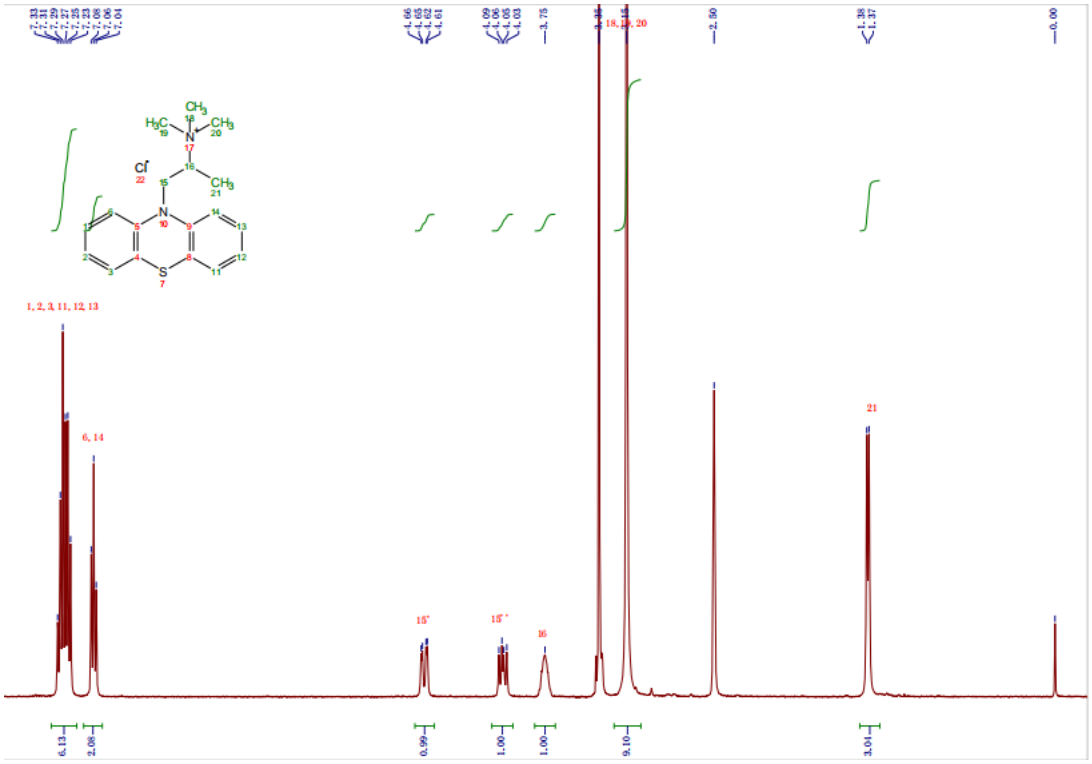


Figure S1-3 ^{1}H NMR Spectrum of TMiPrAPtzCl.

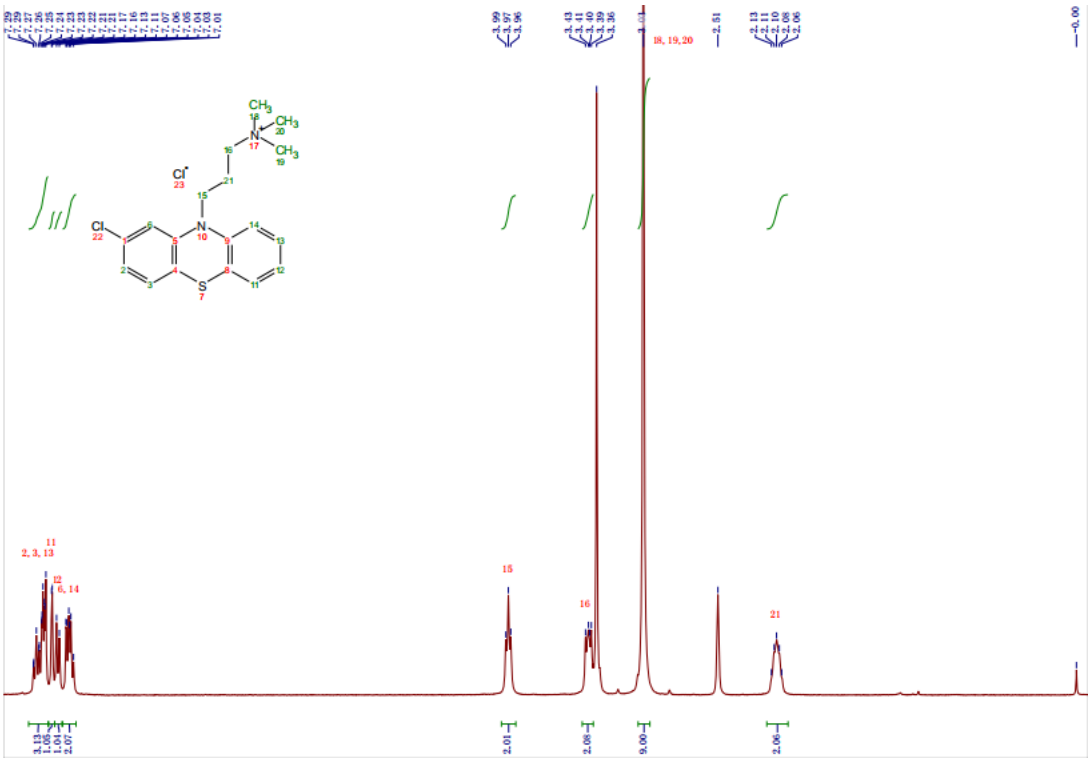


Figure S1-4 ^{1}H NMR Spectrum of TMClPrAPtzCl.

Figure S2

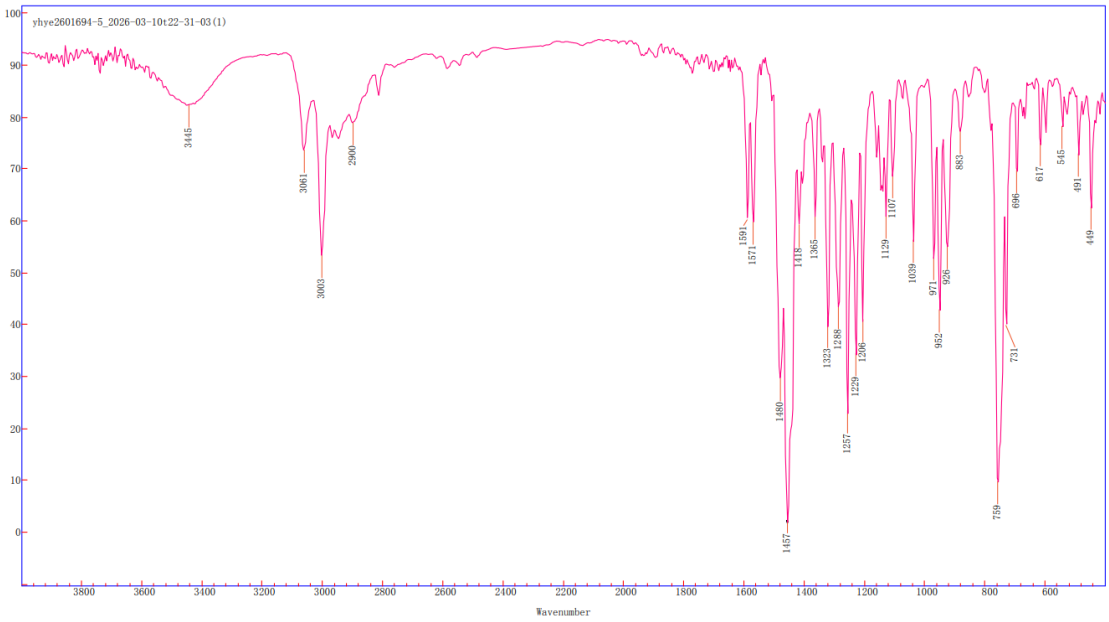


Figure S2-1 FT-IR of TMEtAPtzCl.

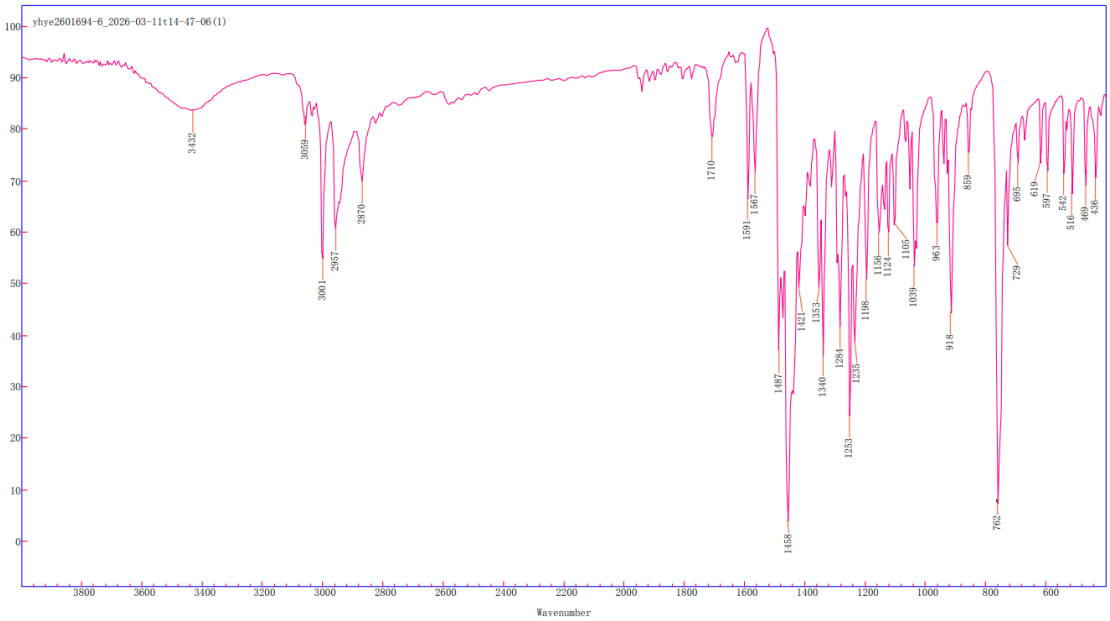


Figure S2-2 FT-IR of TMPrAPtzCl.

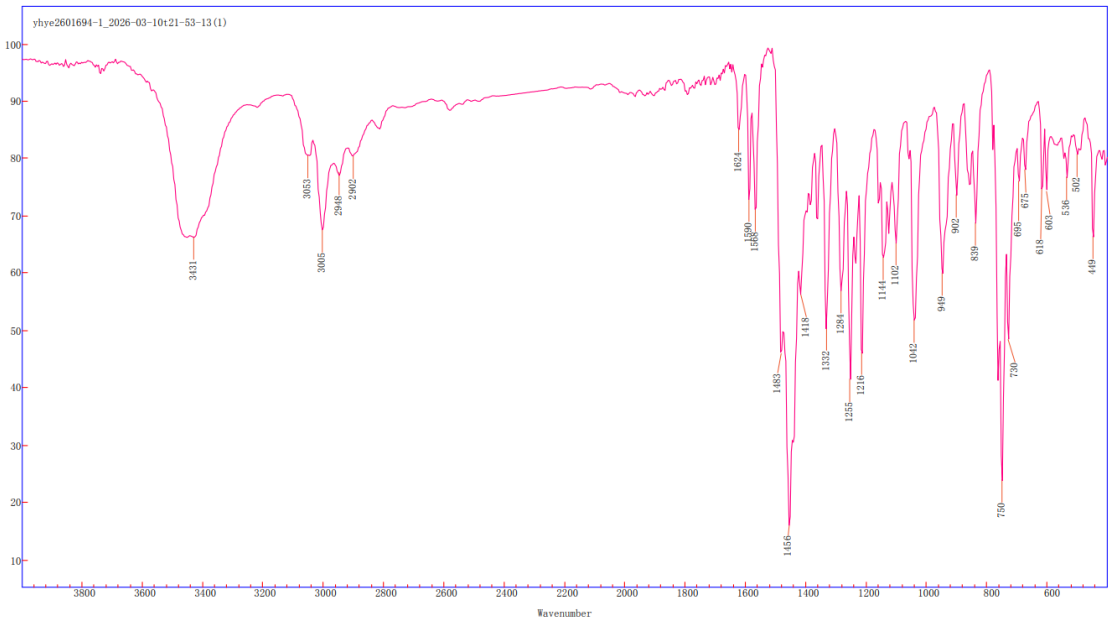


Figure S2-3 FT-IR of TMiPrAPtzCl.

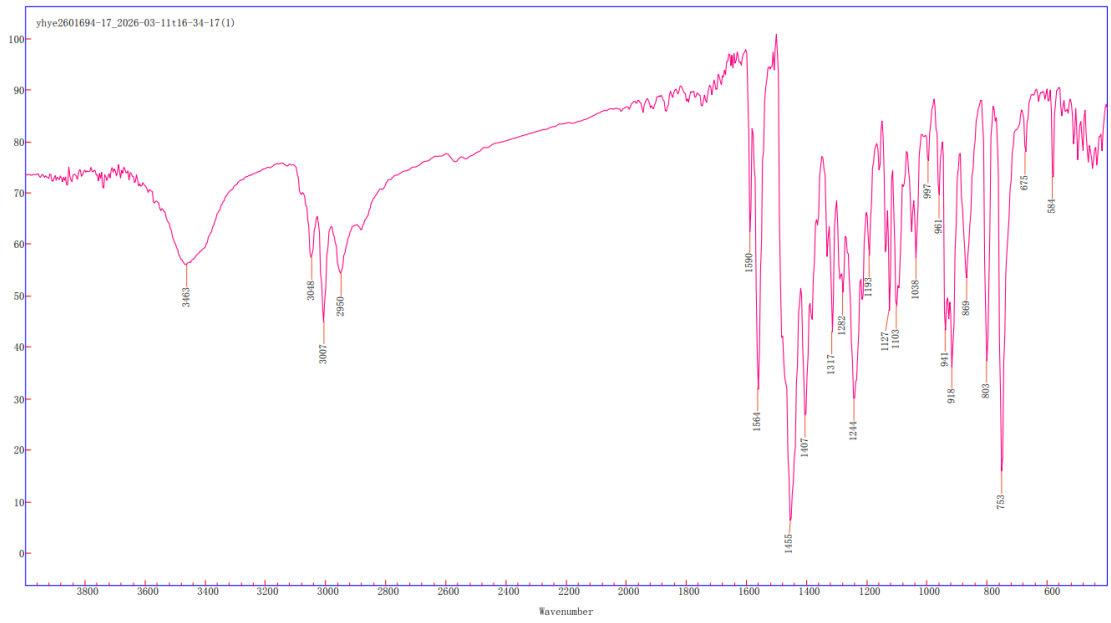


Figure S2-4 FT-IR of TMClPrAPtzCl.

Figure S3

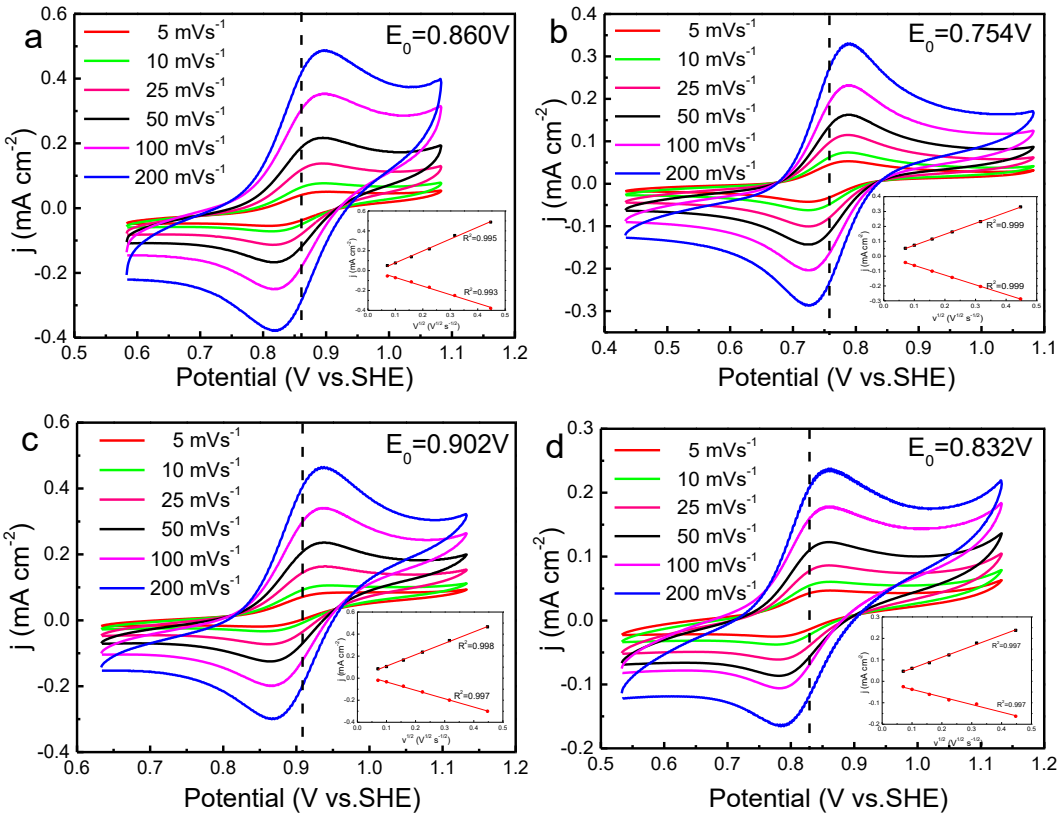


Figure S3 (a-d) CVs of 1 mM TMEtAPtzCl(a), TMPrAPtzCl(b), TMiPrAPtzCl(c) and TMClPrAPtzCl(d) in 1 M NaCl solution at scan rates of 5~200 mV s^{-1}. The inset is the relationship between the peak current densities (j_p) and the square root of the scan rate ($v^{1/2}$).

Figure S4

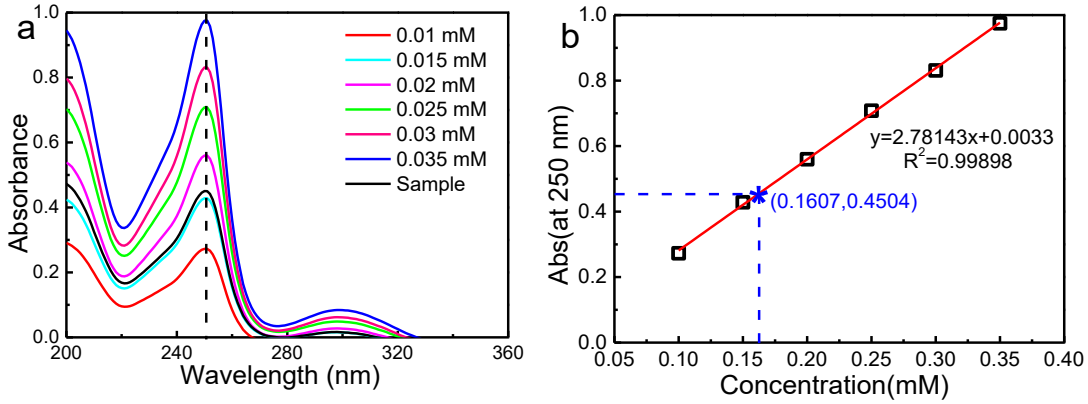


Figure S4-1 (a) UV-Vis absorption spectra of TMEtAPtzCl solutions with varying concentrations in deionized water. (b) Linear plot of TMEtAPtzCl concentration against

the maximum absorbance recorded at λ = 250 nm (10000-fold dilution). The solubility of TMEtAPtzCl in deionized water was determined to ~＞1.61 M at 25±1℃ (calculated based on 1 L of solvent).

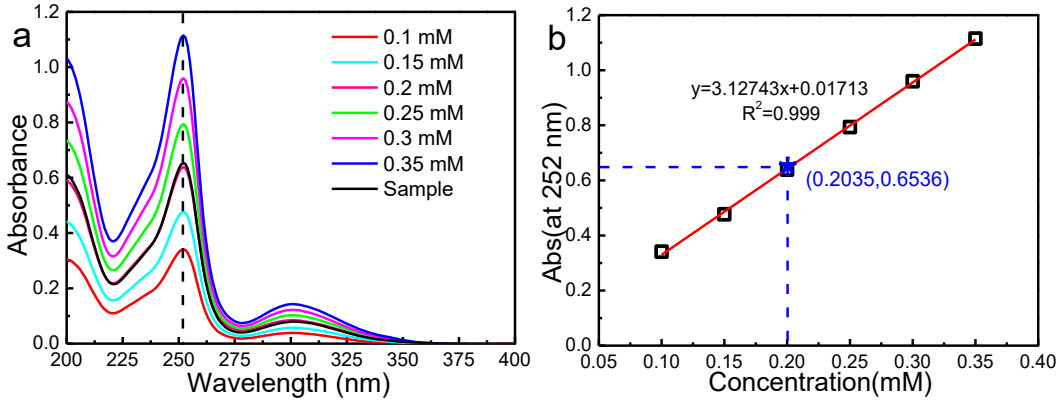


Figure S4-2 (a) UV-Vis absorption spectra of TMPrAPtzCl solutions with varying concentrations in deionized water. (b) Linear plot of TMPrAPtzCl concentration against the maximum absorbance recorded at λ = 252 nm (10000-fold dilution). The solubility of TMPrAPtzCl in deionized water was determined to be 2.03 M at 25±1℃ (calculated based on 1 L of solvent).

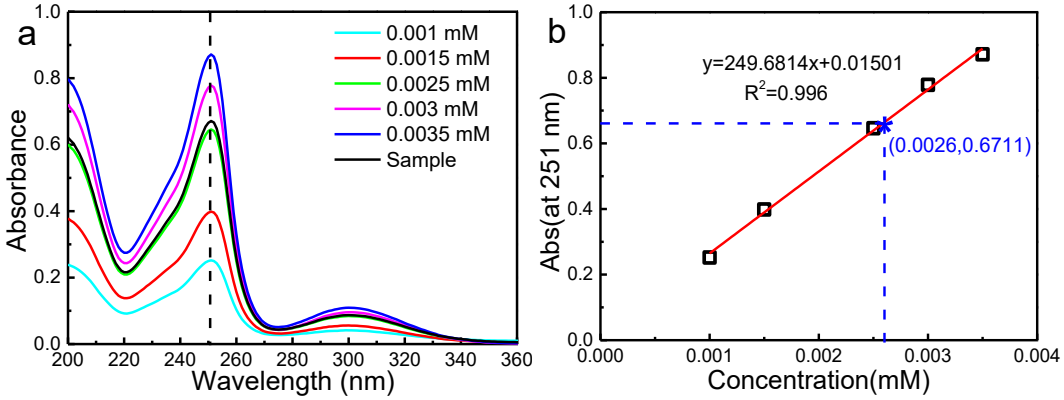


Figure S4-3 (a) UV-Vis absorption spectra of TMiPrAPtzCl solutions with varying concentrations in deionized water. (b) Linear plot of TMiPrAPtzCl concentration against the maximum absorbance recorded at λ = 251 nm (10000-fold dilution). The solubility of TMiPrAPtzCl in deionized water was determined to be 2.69 M at 25±1℃

(calculated based on 1 L of solvent).

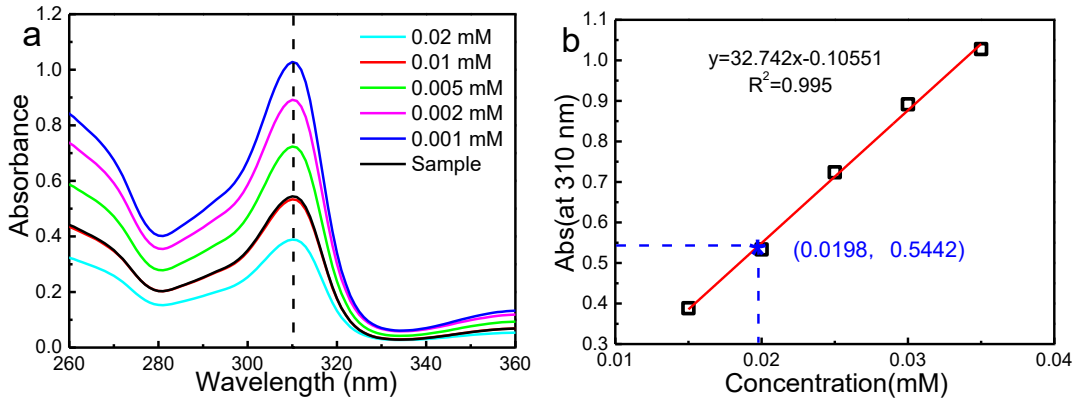


Figure S4-4 (a) UV-Vis absorption spectra of TMClPrAPtzCl solutions with varying concentrations in deionized water. (b) Linear plot of TMClPrAPtzCl concentration against the maximum absorbance recorded at λ = 310 nm (10000-fold dilution). The solubility of TMClPrAPtzCl in deionized water was determined to be 1.90 M at 25±1℃ (calculated based on 1 L of solvent).