

Supplementary Information

Expeditious method for ultra-level chemosensing of Uranyl Ions

Vishaka V Halali and R Geetha Balakrishna *

*Centre for Nano and Material Sciences, Jain University, Jain Global Campus, Kanakapura,
Ramanagaram, Bangalore 562112, India*

Corresponding Author*: br.geetha@jainuniversity.ac.in

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1. Materials

Rhodamine 6G, Hydrazine hydrate, Ethanol, 2-hydroxy-1-naphthaldehyde of analytical lab grade (Sigma-Aldrich) was used for the synthesis of the probe (**P1**). Chloride and nitrate salts of all cations were procured from Sigma-Aldrich and used without any more purification.

2. Instrumentation

All reactions were magnetically stirred and thin-layer chromatography (TLC) by Merck TLC Silica gel 60 F₂₅₄ coated plates were used to monitor the reaction. A Bruker 11767542 ATR-IR spectrophotometer was utilized to carry out the IR analysis of the samples. NMR spectroscopic measurements in CDCl₃ were recorded with an Agilent spectrometer 400. The ¹H NMR and ¹³C NMR chemical shift values are represented in ppm (δ) correlative to CDCl₃. Waters SynaptG2 LC-MS spectrometer was used to record the Mass spectra. Absorbance (UV-Vis) spectroscopic study was carried out with a Shimadzu UV-1800 spectrophotometer using quartz cuvette. AAS measurements were carried out using Agilent 55B AA spectrometer. ICP-OES measurements were recorded Agilent 5100 VDV ICP-OES instrument and all pH deviations were measured with Systronics digital pH meter 802.

3. Synthesis of Schiff base (**P1**)

Chemosensor (**P1**) was synthesized by a simple Schiff base condensation reaction. In the typical experiment, the first step synthesis of Rhodamine 6G Hydrazide was prepared as per the early reported literature[61]. In the second step, 2-hydroxy-1-naphthaldehyde (2.0 mM) was added to the stirring Rhodamine 6G Hydrazide (2.1 mM) in ethanol (25 mL) and the reaction was refluxed for 24 h at 70 °C. The obtained product was filtered and the filtrate was washed many times with absolute ethanol to remove any unreacted material. The purity of the product was checked by spotting a product on chromatographed silica plate [60 F₂₅₄] with an eluent hexane/ethyl acetate (8:2, v/v) to get a light yellow solid (**P1**). The final product was characterized using ¹H NMR, ¹³C NMR, LC-MS, and ATR-IR.

4.

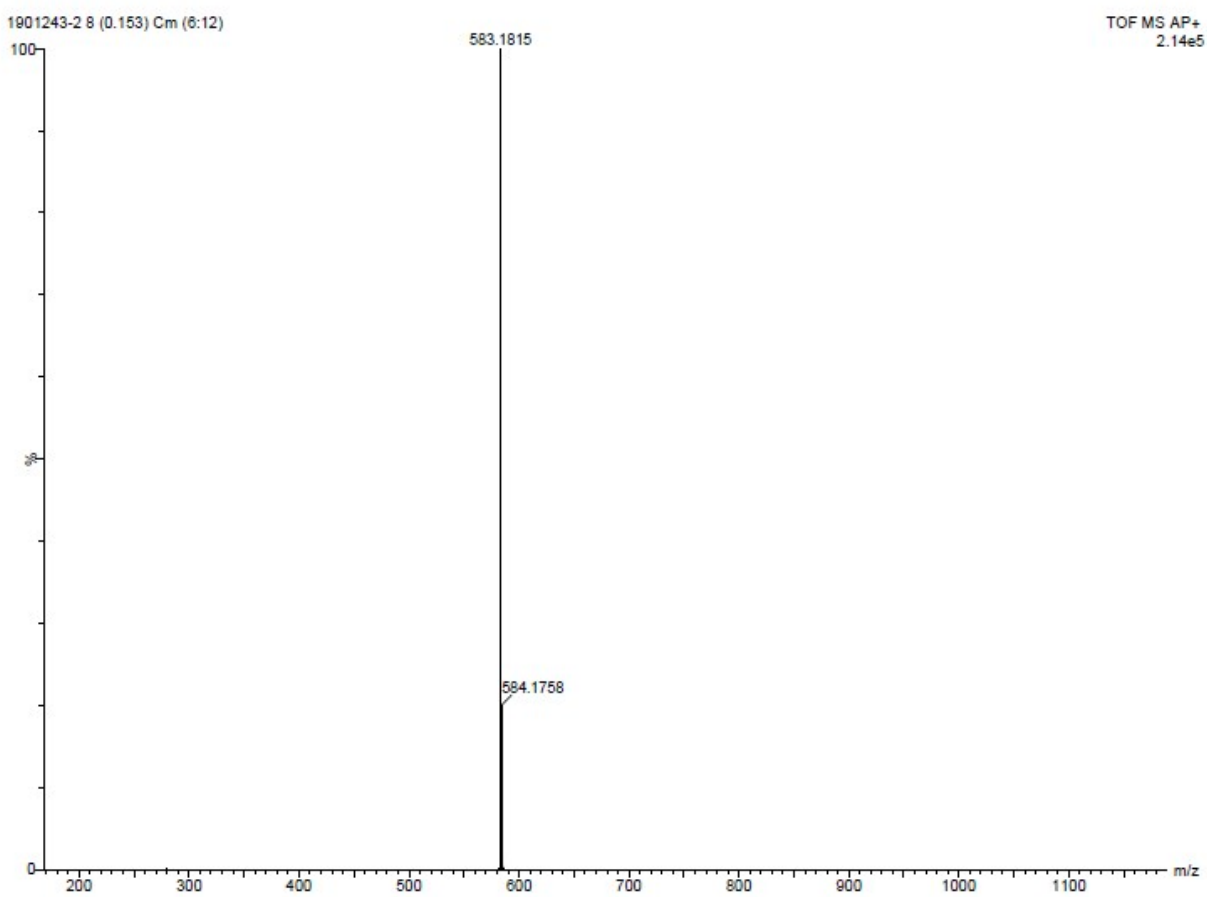
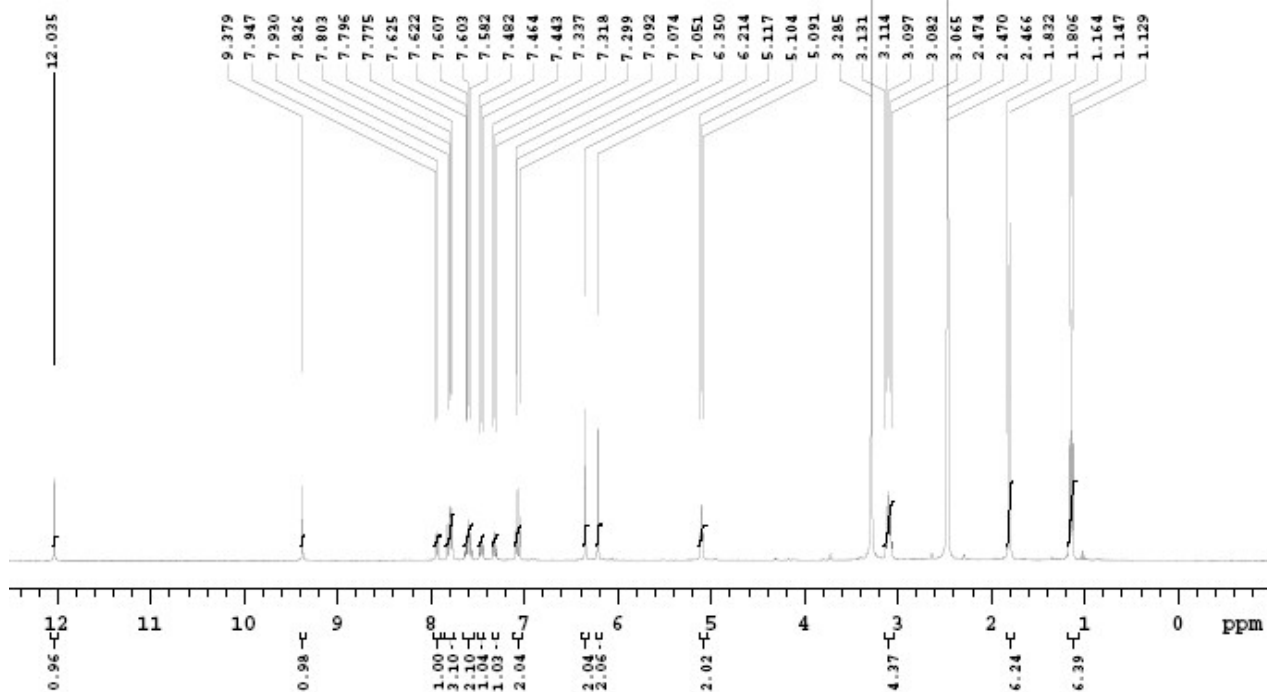


Fig. S1 Mass spectrum of P1

5.

(a)



(b)

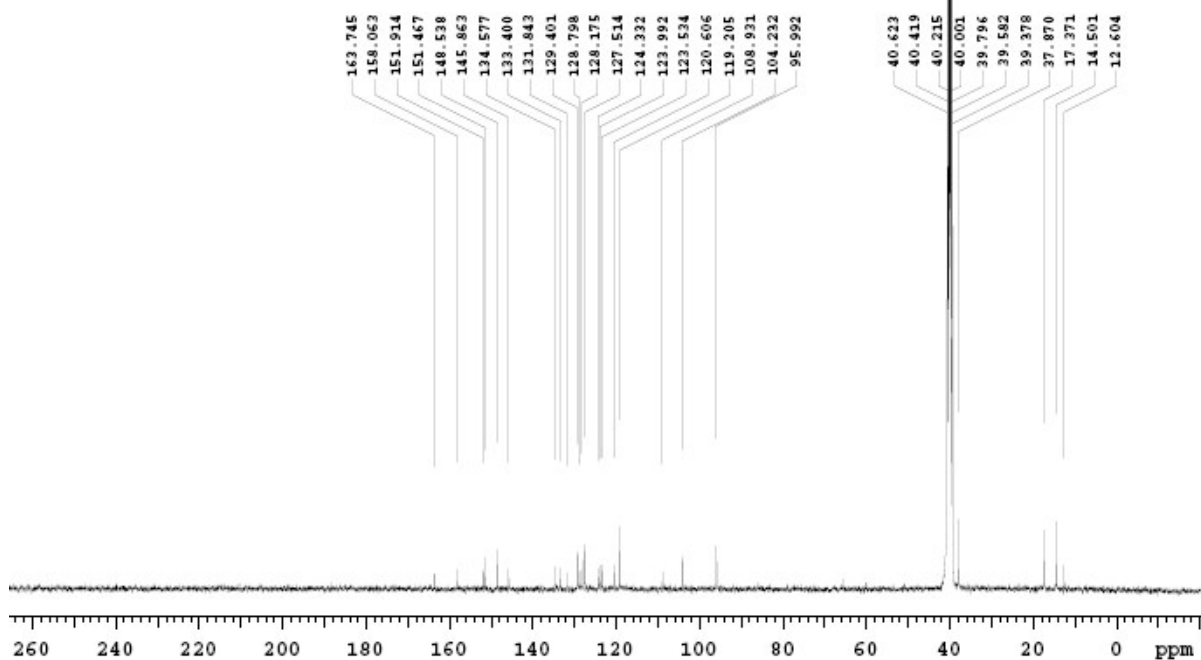


Fig. S2 (a) ¹H NMR spectrum of P1 and (b) ¹³C NMR spectrum of P1

6.

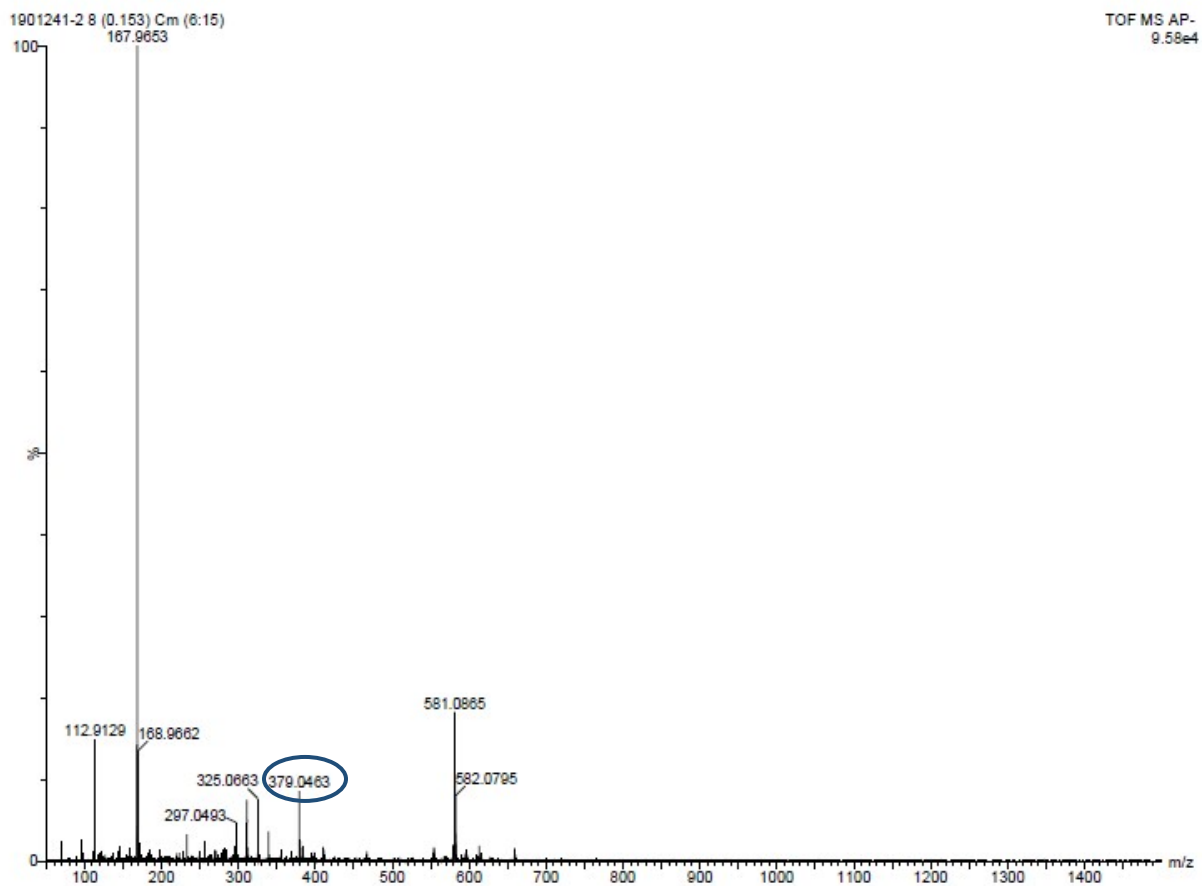


Fig. S3 Mass spectra of Probe P1 + UO_2^{2+} complex

7.

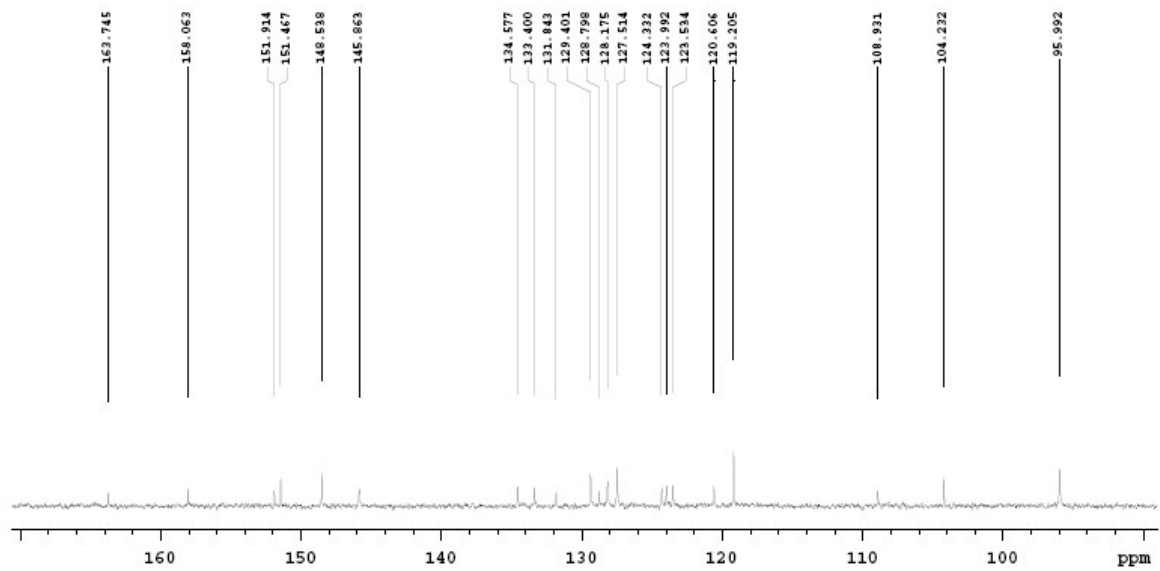


Fig. S4 ^{13}C NMR spectrum of P1 + UO_2^{2+} + AcO^-

8.

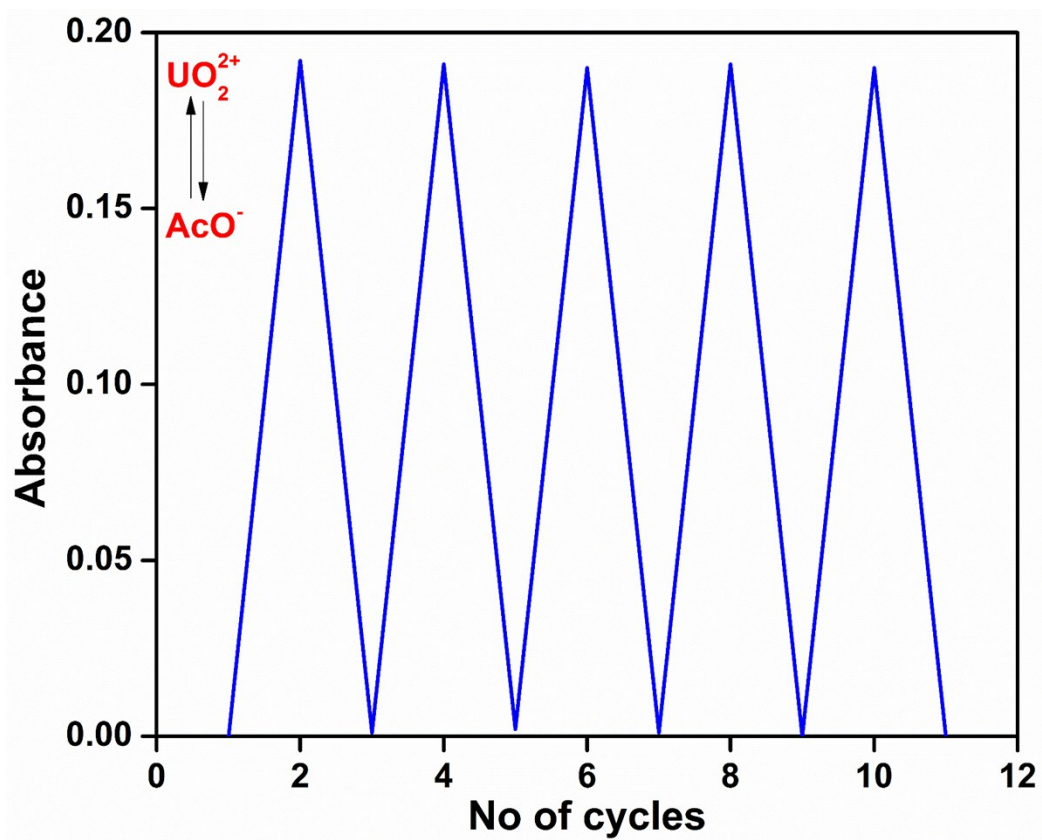


Fig. S5 Recyclability spectrum of P1 with AcO^- ions

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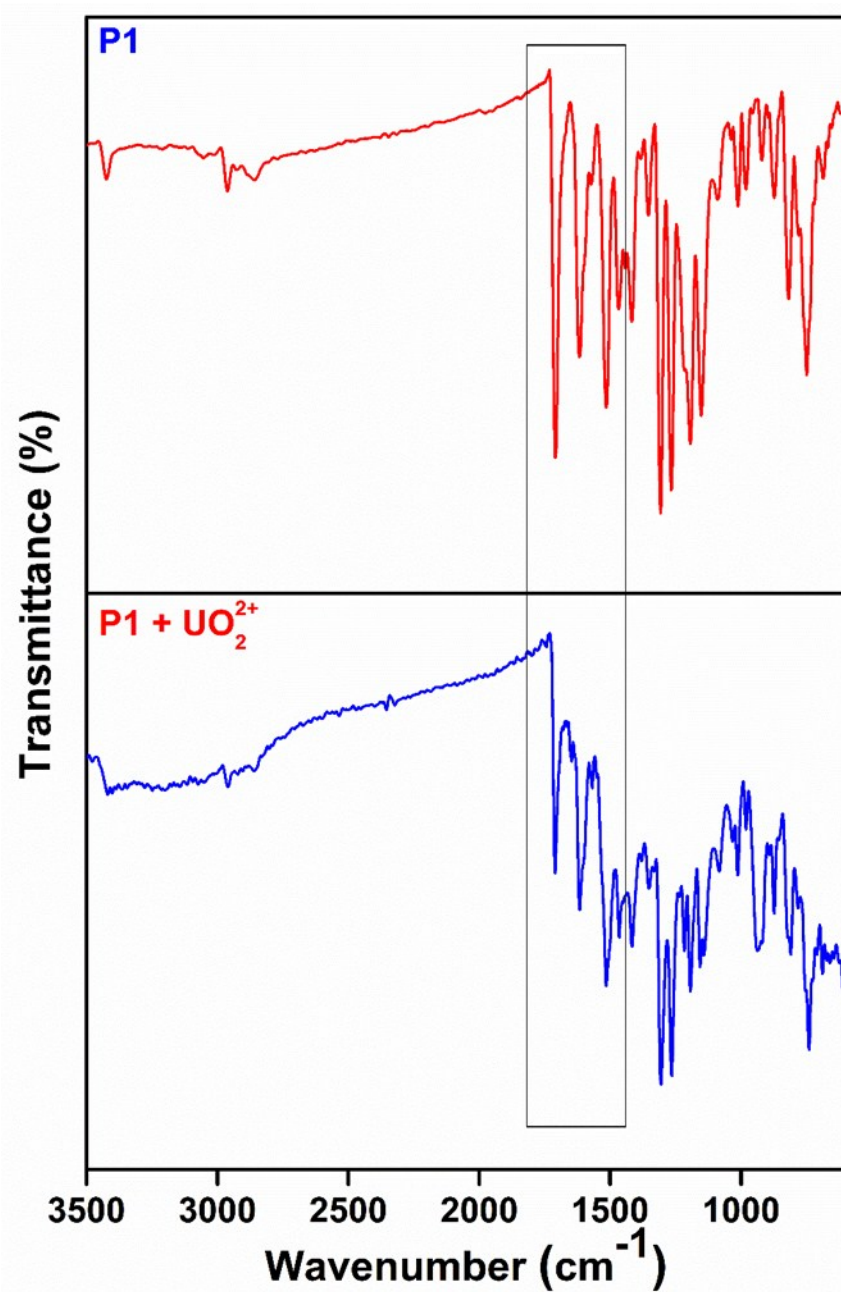


Fig. S6 IR spectrum of P1 and P1 + UO₂²⁺

10. Measurement of Optical Properties of P1

The solution of probe **P1** (1.0×10^{-4} M) and different metal ion stock solution (1.0×10^{-2} M) were **prepared in MeCN at pH 6**. The UV-vis spectrum of the solution (50 μ M) was recorded using a quartz optical cuvette at ambient temperature. For the titration experiments, the concentration of **P1** was kept constant while the concentration of metal ions was varied between 0 to 100 μ M. The binding constant for the complex **P1** + UO_2^{2+} was calculated using the Benesi-Hildebrand plot [62] in which the graph was plotted between $A_0/A-A_0$ and $1/\text{UO}_2^{2+}$ and the slope of the plot was calculated. Also, the detection limit was estimated by measuring the standard deviation of blank [61].

11. Source of UO_2^{2+} in groundwater real samples

Groundwater samples were collected from Magadi Lake, Chickmagalur district and collected from Chickballapur Lake, Kolar district, Karnataka, India.