Supplementary Material (ESI) for Chemical Communications

Nucleic Acid-Induced Self-Assembly of Platinum(II) Terpyridyl Complex: Detection of G-Quadruplex Formation and Nuclease Activity

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SUPPORTING INFORMATION

Assay procedure for G-quadruplex measurements: Generally, 36 μl of the short oligonucleotide was mixed with 36 μl of a buffered solution of the metal chloride salt. The mixture was incubated at 90 °C for 15 min, allowed to cool down to room temperature, and was left at 4 °C for 24 hrs. Appropriate amounts of Tris-HCl buffer solution (pH 7.5), TFE, and the metal complex were added, and the UV-vis and emission spectra were recorded. Final solution volume was 360 μl, and all concentrations were calculated as the final concentration in the assay solution mixture, with Tris-HCl, 5 mM; metal complex, 30 μM; oligonucleotide, 20 μM. Excitation wavelength: 430 nm. Emission spectra were corrected for PMT response.

Assay procedure for nuclease measurements: 148 μl of H_2O was mixed with 62 μl of buffer solution (25 mM sodium acetate, 50 mM NaCl, 5 mM zinc sulphate, pH4.6) and 20 μl 1.62 mM of poly$(dT)_{25}$. The mixture was then added 10 μl of nuclease S1 (1 unit/5 μl) and incubated at 37 °C. 120 μl of 90 μM metal complex was added to reach the final solution volume to be 360 μl. The UV-vis and emission spectra were then recorded at room temperature. Excitation wavelength: 430 nm. Emission spectra were corrected for PMT response.

Materials and synthesis: All oligonucleotides were purchased from Sigma-Proligo of HPLC grade, and **1** was synthesized according to a previously reported procedure[1] involving the reaction of [Pt(tpy)Cl]OTf with penta-2,4-diyn-1-ol in the presence of triethylamine and copper(I) iodide as catalyst in DMF.

Spectroscopic studies:

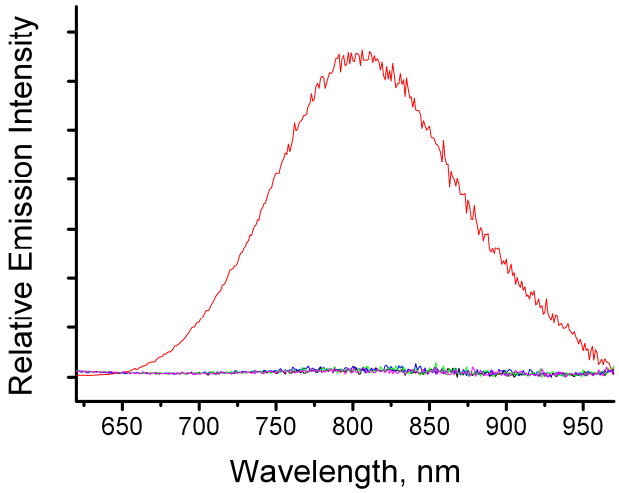

Fig. S1 Emission spectra of 20 µM of oligonucleotide TGGG and 30 µM of **1** in the presence of 25 mM KCl (—), 50 mM LiCl (—), 50 mM $MgCl_2$ (—), 50 mM $CaCl_2$ (—) and 400 mM NaCl (—). Medium: 5 mM Tris-HCl, pH 7.5, 20 % trifluoroethanol. With the exception of KCl, the spectra in the presence of all other metal chlorides overlapped with that of the background.

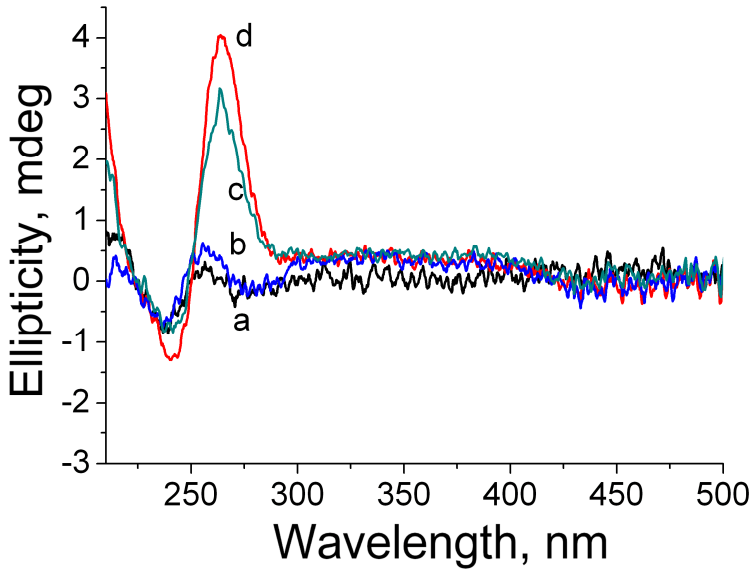

Fig. S2 CD spectra of 20 µM TGGG (line a), and upon addition of 25 mM NaCl (line b); 25 mM KCl and 30 µM of **1** (line c); and 25 mM KCl (line d). Medium: 5 mM Tris-HCl, pH 7.5, 20 % trifluoroethanol.

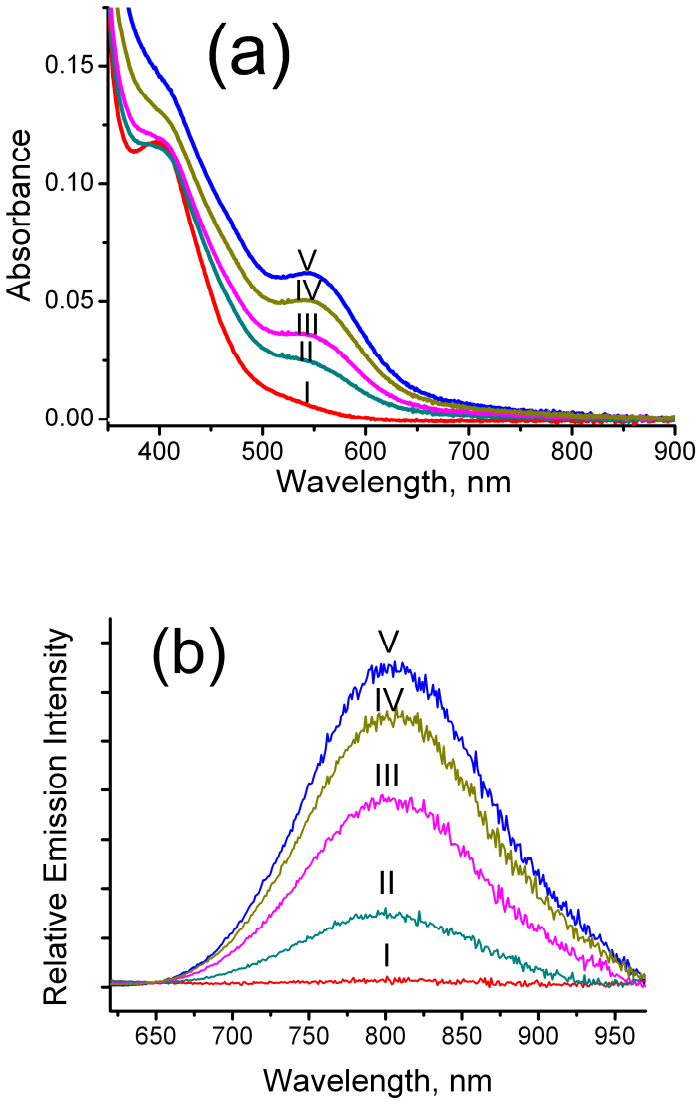

Fig.S3 (a) UV-Vis and (b) emission spectral changes showing the formation of the MMLCT band as a result of the self-assembly of the platinum(II) complexes. Final concentration: 20 μM of oligonucleotide TGGG and 30 μM of **1** in the presence of 25 mM of NaCl (line I), 25 mM of 18-crown-6 + 25 mM of KCl (line II), 25 mM of 15-crown-5 + 25 mM of KCl (line III), 25 mM of 12-crown-4 + 25 mM of KCl (line IV), and 25 mM of KCl (line V). Medium: 5 mM Tris-HCl, pH 7.5, 20 % trifluoroethanol.

References:

1. C. Yu, K. H. Y. Chan, K. M. C. Wong, V. W. W. Yam, *Proc. Natl. Acad. Sci. USA*, 2006, **103**, 19652.