

Supporting Information for

Covalent functionalisation of Organic Nanoparticles by Aryl Diazonium chemistry and their Solvent Dependent Self-assembly

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1. Chemical structure of RuN_2^+

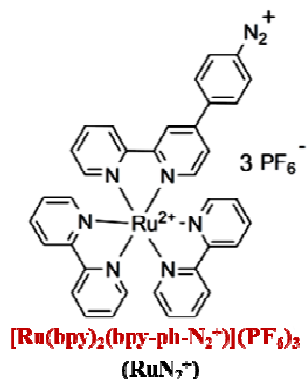


Figure S1. Chemical structure of RuN_2^+

Characterization of RuFDN

2. Absorption and emission spectra of RuFDN

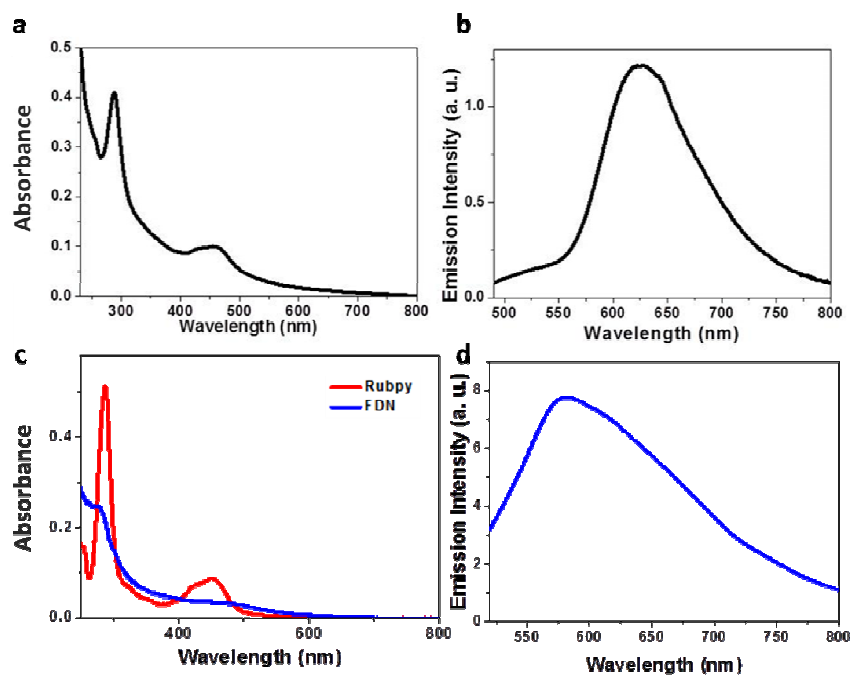


Figure S2. (a) Absorption and (b) emission spectra of RuFDN in acetonitrile. (c) Absorption spectra of Rubpy and FDN (conc. = 1.3×10^{-6} M, Solvent = acetonitrile). (d) Emission spectrum of FDN (conc. = 1.3×10^{-4} M, Solvent = acetonitrile).

3. IR spectra of RuN_2^+ and RuFDN

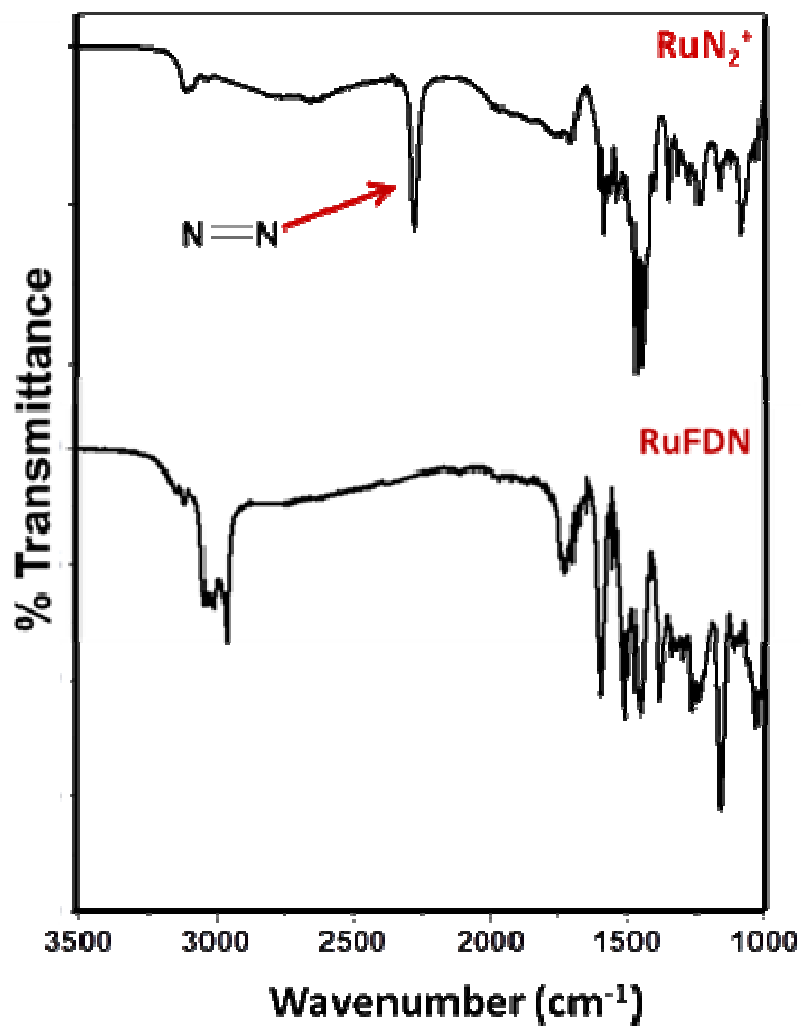


Figure S3. IR spectra of RuN_2^+ (top) and RuFDN (bottom).

4. EDX analysis

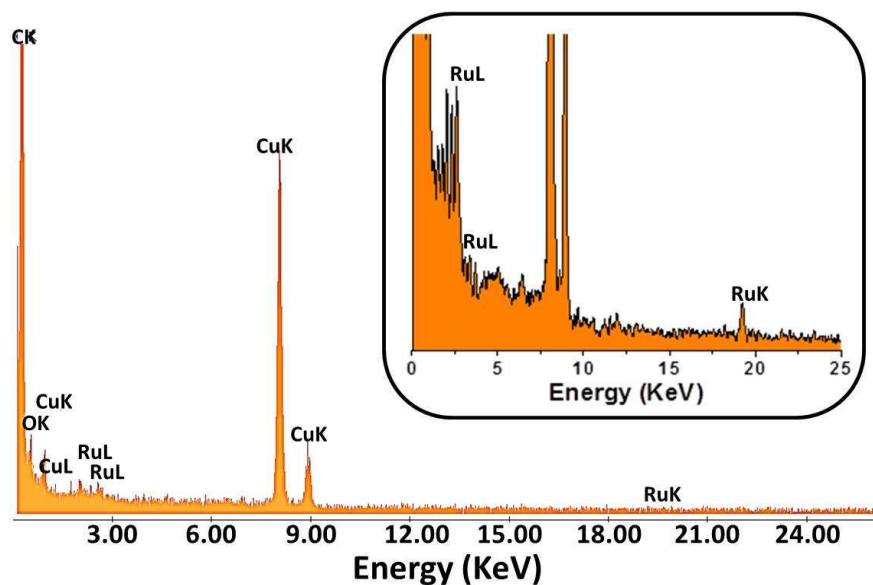


Figure S4. EDX spectrum of RuFDN (inset shows the expanded EDX spectrum).

5. Elemental composition of RuFDN

Element	Atomic %
C	90.6
O	2.1
Cu	7.2
Ru	0.1
Total	100.0

Table ST1. Atomic percentage of FDN obtained from quantitative EDX analysis.

6. Thermogram of RuFDN and FDN.

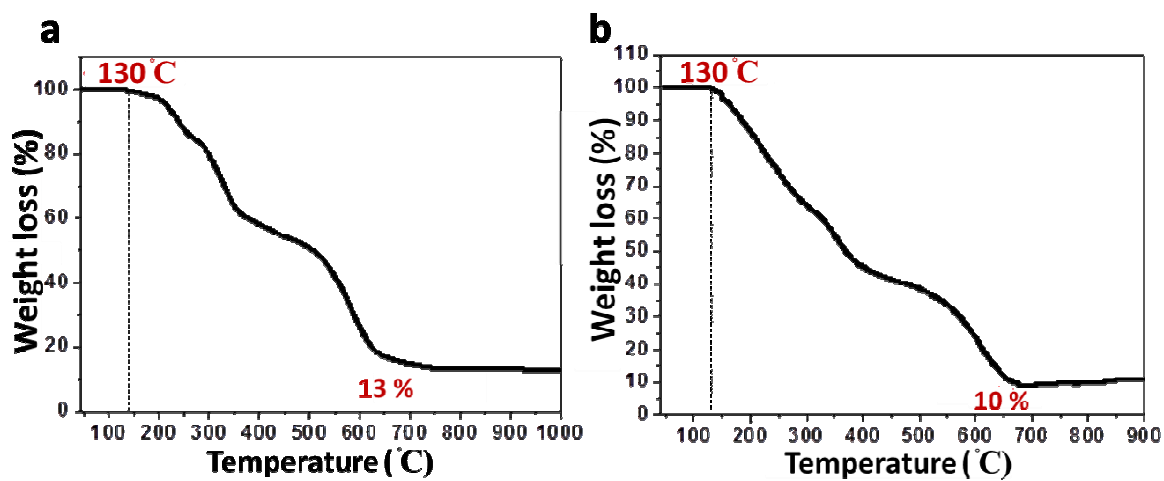


Figure S5. Thermogram of (a) RuFDN and (b) FDN.

7. Possible structures formed on multiple layering

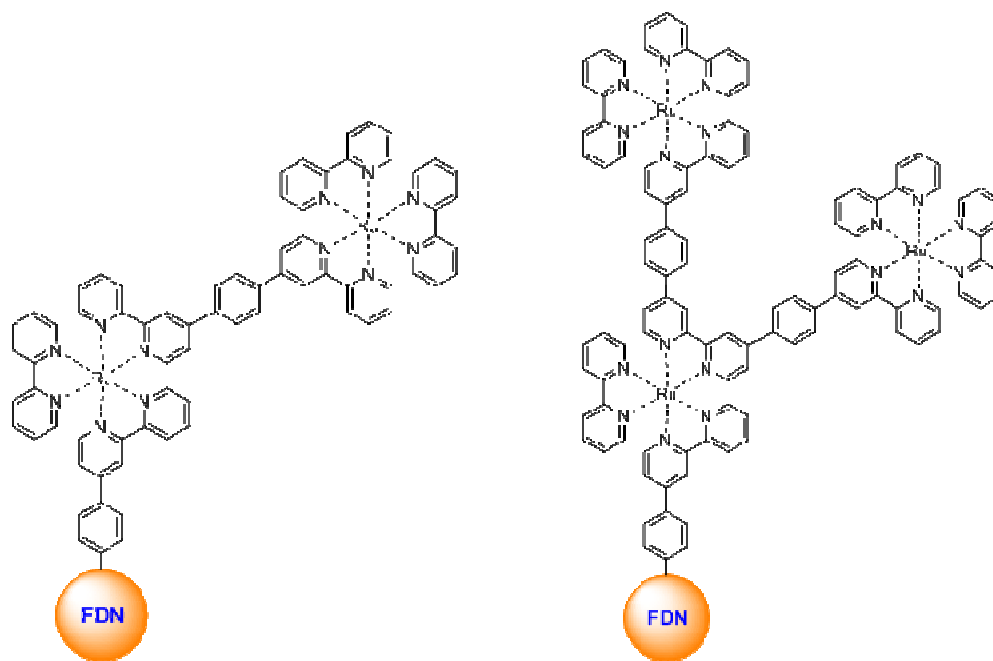


Figure S6. Possible structures formed on multiple layering.

8. Lifetime measurements of RuFDN and FDN

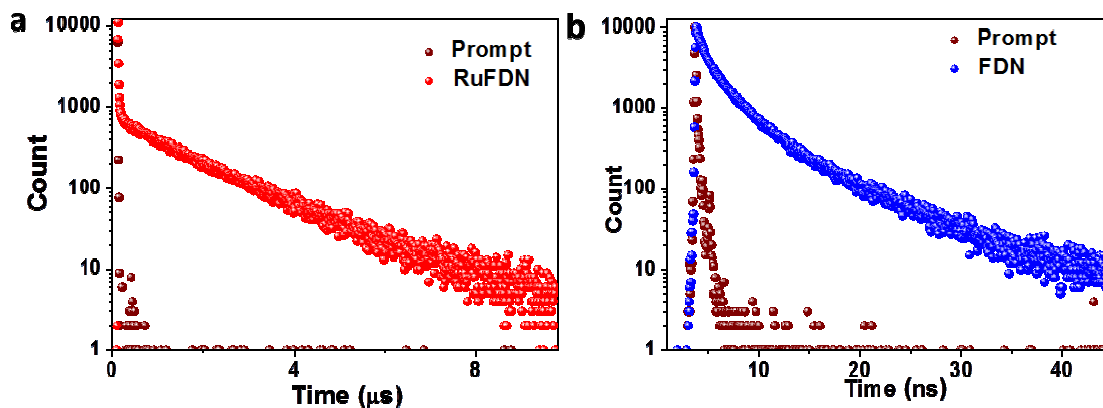


Figure S7. Emission decay profiles of (a) RuFDN and (b) FDN in acetonitrile ($\lambda_{\text{exc}} = 440 \text{ nm}$)

	$\tau_1 \text{ (ns)}$	χ_1	$\tau_2 \text{ (ns)}$	χ_2	$\tau_3 \text{ (ns)}$	χ_3	χ^2
RuFDN	3.03	27.01	17.90	3.79	790.81	69.20	1.02
FDN	0.65	7.61	2.58	41.24	8.39	51.15	1.09

Table ST2. Fluorescence decay parameters for RuFDN and FDN. Three lifetimes (τ_1 , τ_2 , τ_3) and the respective fractional contributions (χ_1 , χ_2 , χ_3) and the χ^2 values for the data in Figure S7 are shown.

RuFDNs exhibited a triexponential decay with lifetimes 3.03 ns (27.01%), 17.90 ns (3.79%) and 790.81 ns (69.2%) ($\lambda_{\text{exc}} = 440 \text{ nm}$, $\chi^2 = 1.02$). The short components (3.03 ns and 17.9 ns) observed corresponds to the FDN moiety of the RuFDN and the longer components observed in lifetime 790.81 ns corresponds to the ruthenium(II) bipyridine complex unit of the RuFDN

Self-assembly of RuFDNs

9. TEM and AFM images of RuFDN at 5×10^{-4} M concentration in water

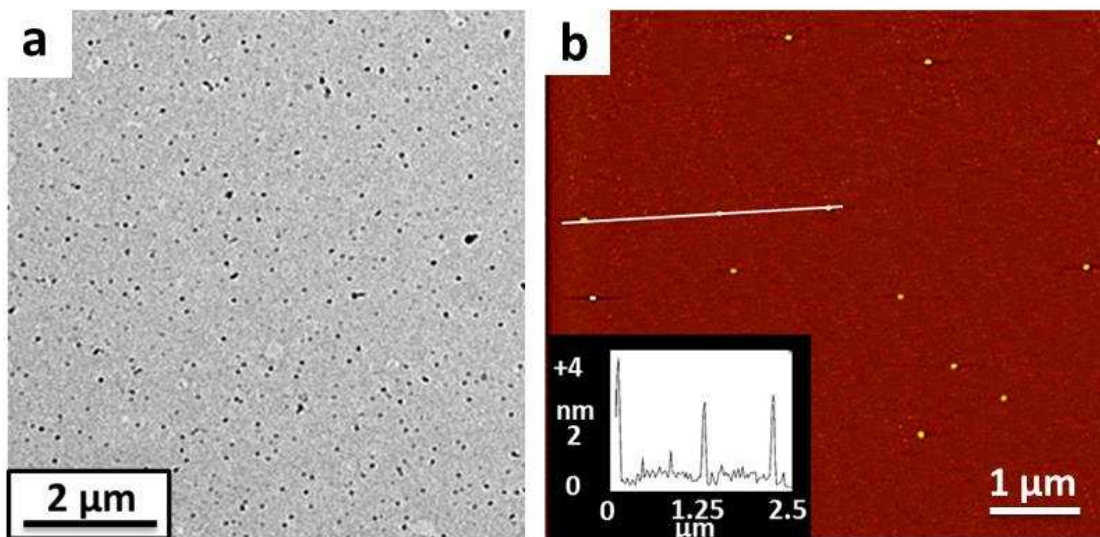


Figure S8. (a) TEM and (b) AFM images of RuFDN (in water) at 5×10^{-4} M concentration. Inset of (b) shows the height profile of the AFM image.

10. AFM images of RuFDN in dichloromethane

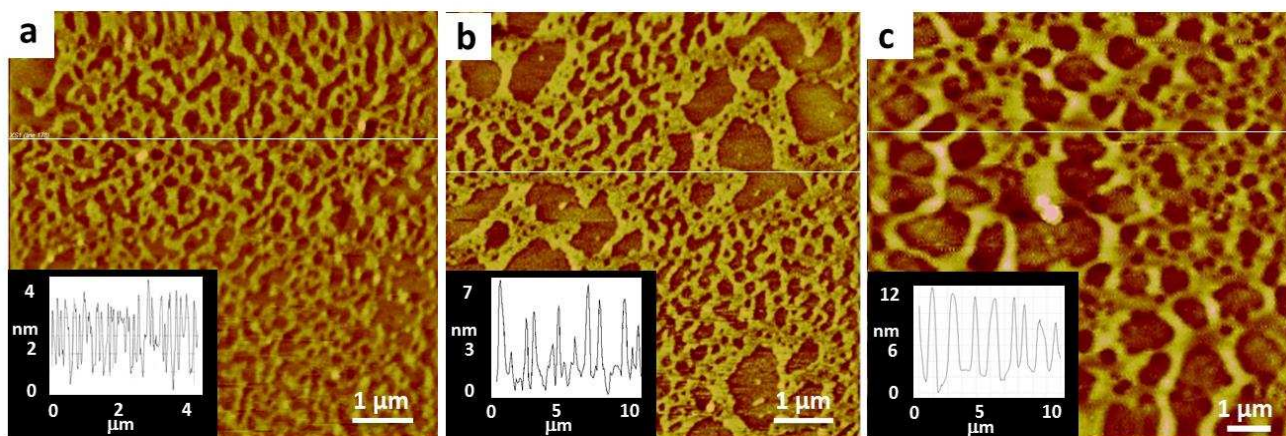


Figure S9. AFM images of RuFDN (in dichloromethane) at different concentrations: (a) 5×10^{-6} M, (b) 5×10^{-5} M and (c) 5×10^{-4} M. Inset of (a, b, c) – Height profile of respective images.

11. TEM image of RuFDN in acetonitrile

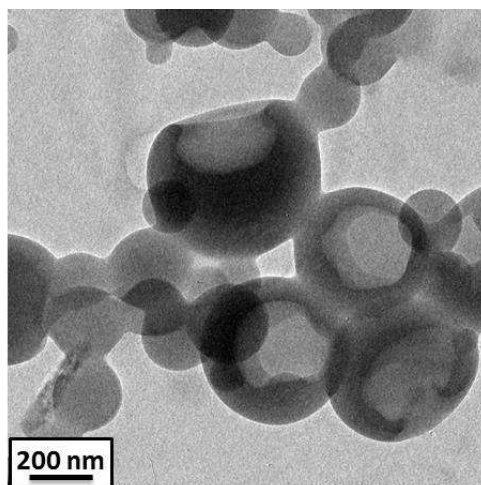


Figure S10. TEM image obtained by drop-casting RuFDN in acetonitrile (Conc.: 5×10^{-4} M).

12. AFM images of RuFDN in acetone

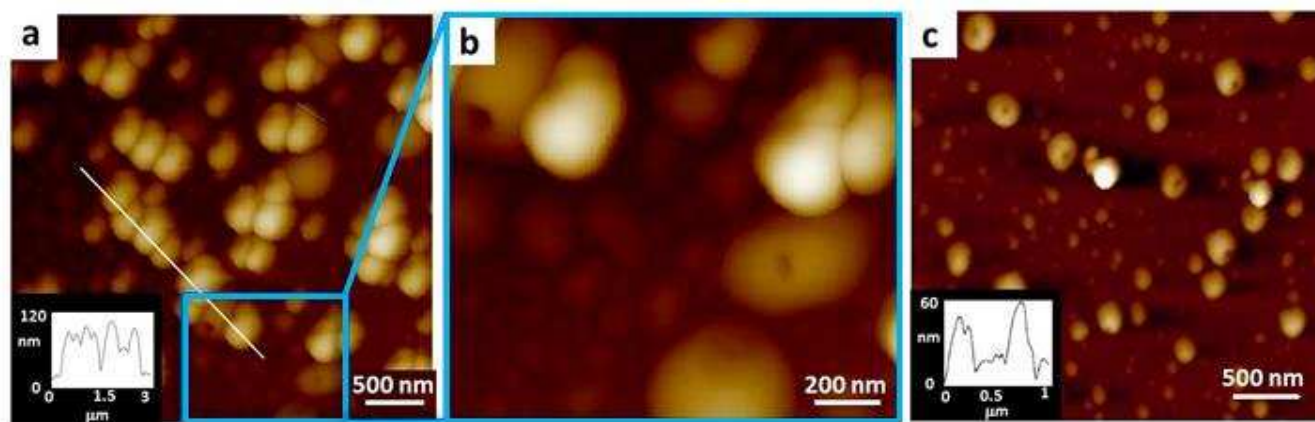


Figure S11. AFM images of RuFDN (in acetone) obtained by fast evaporation of solvent at (a) 5×10^{-4} M and (c) 5×10^{-5} M concentrations. (b) Zoomed in image of particles at 5×10^{-4} M concentration.

13. SEM and confocal fluorescence images of RuFDN

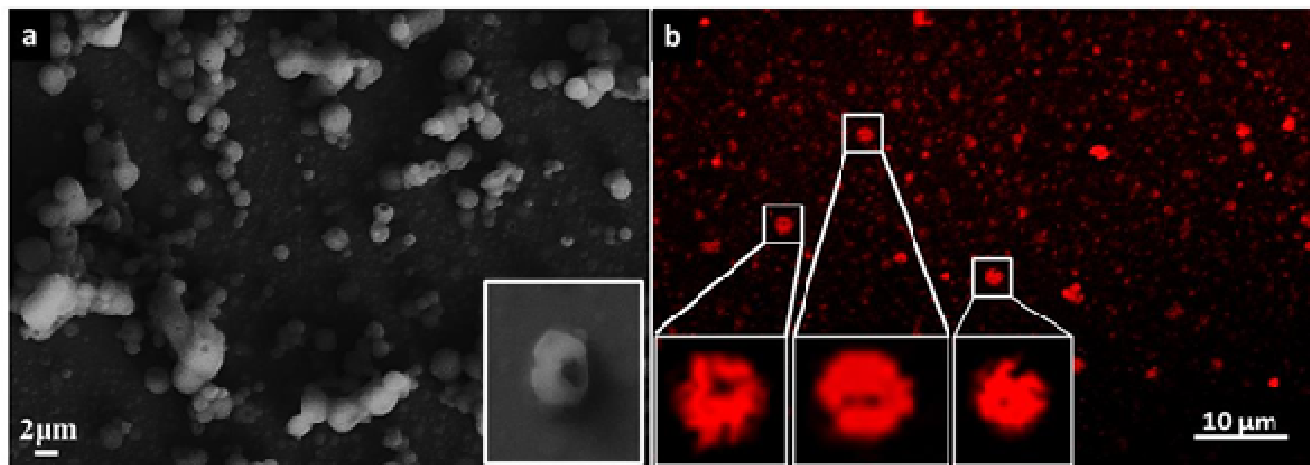


Figure S12. (a) SEM and (b) confocal fluorescence images of RuFDN at a concentration of 1.3×10^{-3} M in acetone. Inset of (a, b) shows the zoomed in image of the microcapsules.

14. Zeta potential measurements

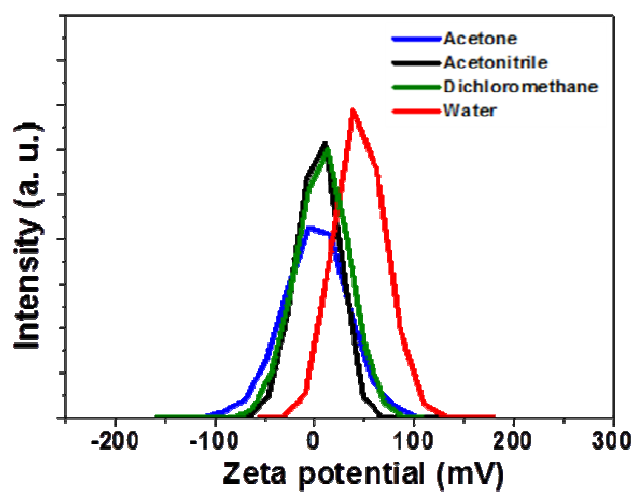


Figure S13. Zeta potential curve of RuFDN in different solvents.

15. Quenching studies

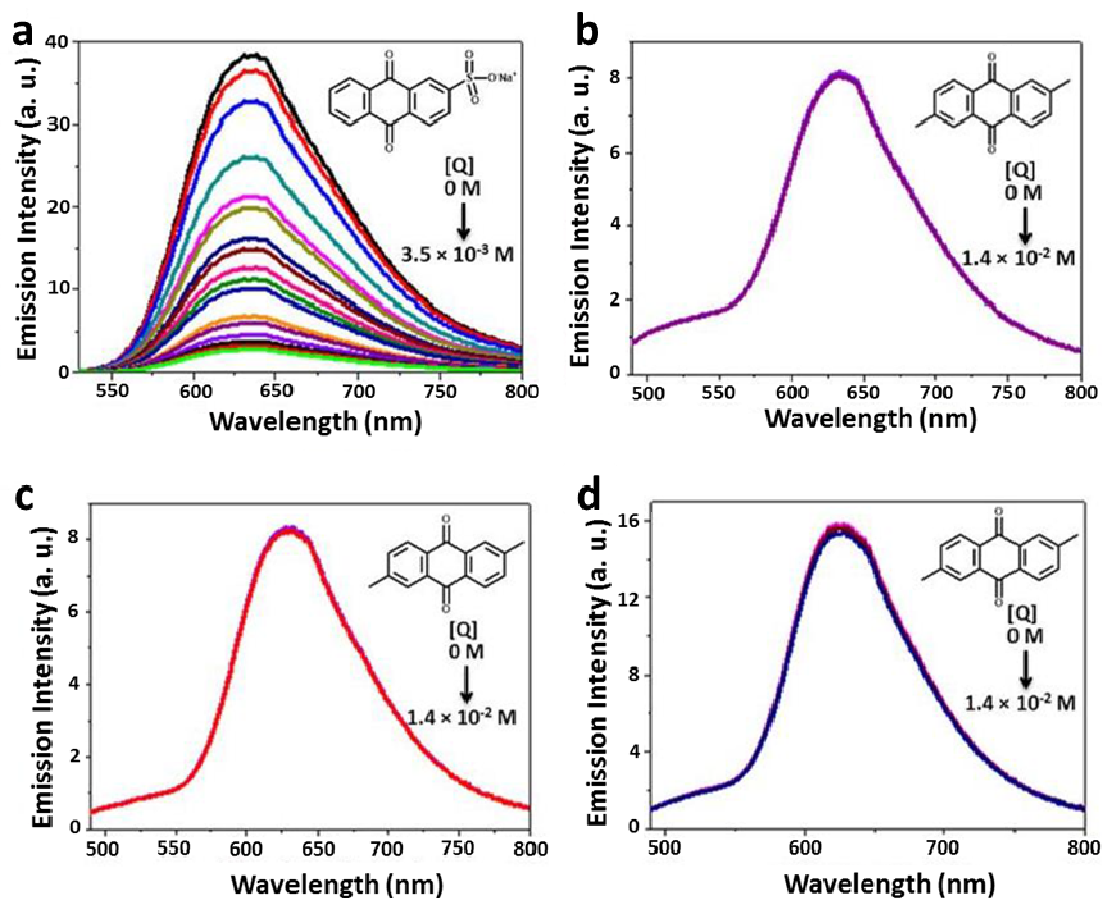


Figure S14. Emission spectra of RuFDN (1.4×10^{-4} M) in different solvents, upon addition of increasing concentrations of anthraquinone quenchers: (a) water, (b) acetone, (c) acetonitrile and (d) dichloromethane. Inset shows the chemical structure of the quencher used in each case.