Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

A Low Affinity Nanoparticle Based Fluorescent Ratiometric Probe for the Determination of Zn (II) Concentrations in Living Cells

Graham. R.C. Hamilton[1], Simanpreet Kaur[1], Sukanta Kamila[1], Bridgeen Callan[1] and John F. Callan[1]*

1. Biomedical Sciences Research Institute, The University of Ulster, Northern Ireland, UK. BT52 1SA.

Monomer	Chemical Shift (ppm)	Proton(s)	Integration (mm)	Integration/Proton (mm)	% Incorporation
3 + 4	1.8 - 2.2	6	168	28	89.1
1 + 2	6.7 - 8.7	22	67	3.05	10.9

Table S1: % incorporation of both **1** and **2** in the polymer chain determined by integration of peaks between 6.7 – 8.7 ppm, and comparing the relative integration per proton against the relative integration per proton for the methyl protons from **3** and **4** (1.8 – 2.2 ppm).

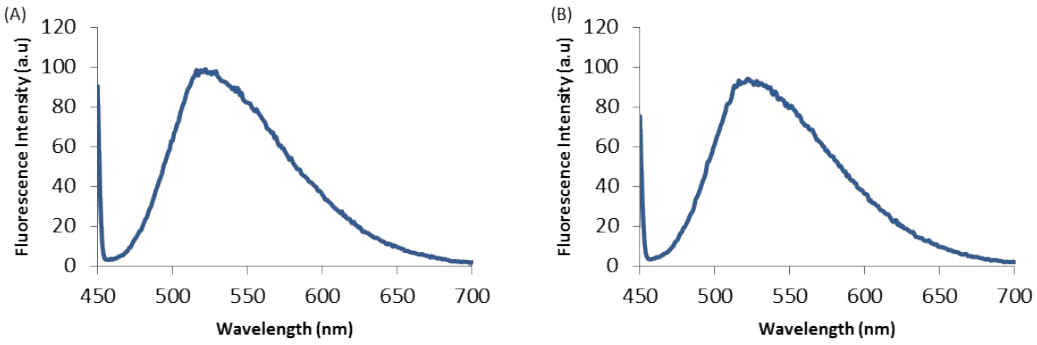

Figure S1: Fluorescence spectra of (a) **1** and (b) **5** recorded in DMF solvent using a λ_{EX} = 435 to obtain both spectra.

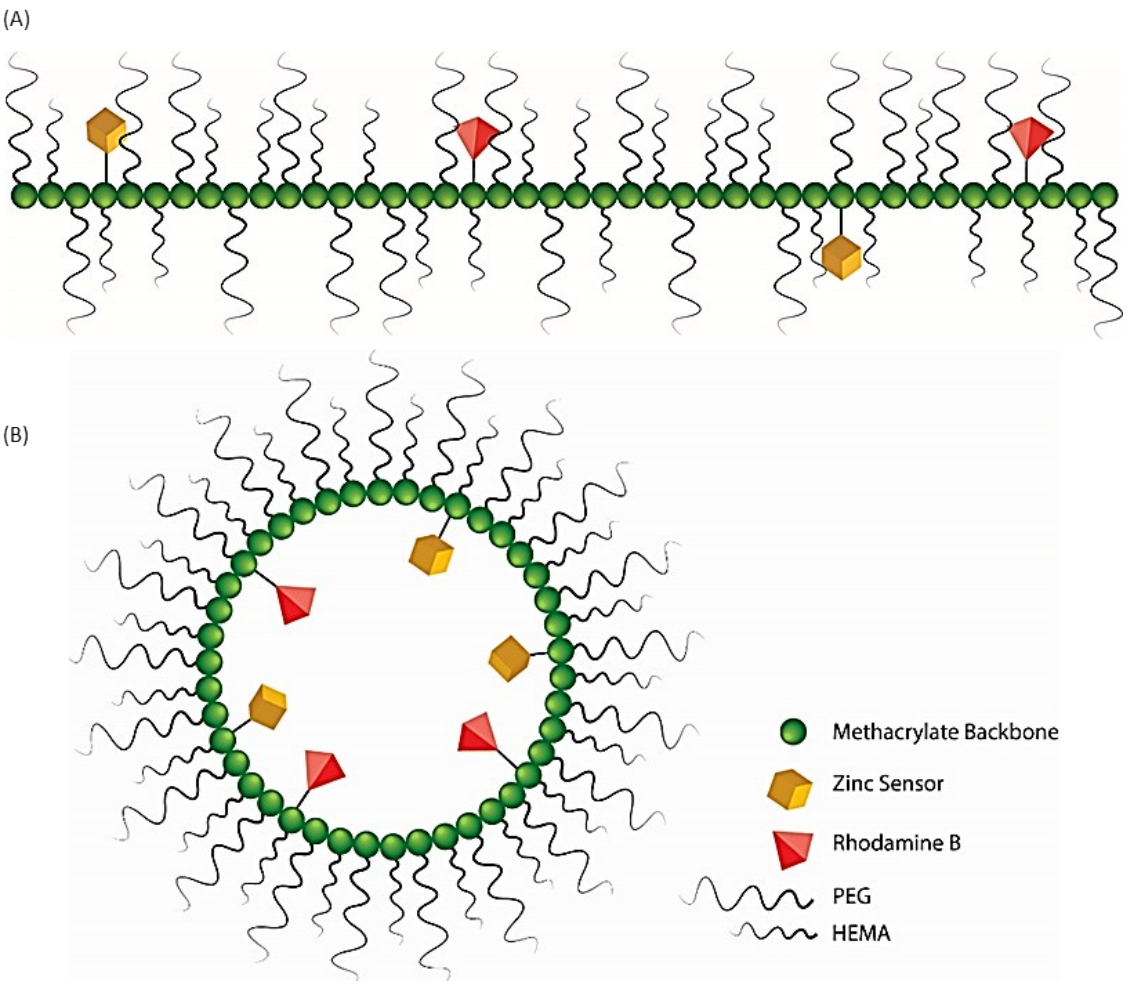

Figure S2: Schematic representation of polymer **5** existing in (a) a linear confirmation where the napthalimide and rhodamine B fluorophores are kept apart or (b) self-assembly into a nanoparticle micelle where the napthalimide and rhodamine B units are brought closer together.

	Naphthalimide Channel		Rhodamine Channel		Ratiometric Response	
	No Zn(II)	Zn(II)	No Zn(II)	Zn(II)	No Zn(II)	Zn(II)
ROI1	9.160	21.080	35.947	48.009	0.255	0.439
ROI2	9.510	20.420	31.985	38.111	0.297	0.536
ROI3	9.300	18.630	44.694	44.129	0.208	0.422
ROI4	9.610	17.300	50.061	43.725	0.192	0.396
ROI5	8.810	17.690	45.593	42.139	0.193	0.420
Avg.	**9.278**	**19.024**	**41.656**	**43.223**	**0.229**	**0.443**
S.D	**0.282**	**1.489**	**6.656**	**3.203**	**0.041**	**0.049**

Table S2: Relative emission intensities (ROI) taken across 5 cells using the naphthalimide (λ_{EX} = 458 nm, λ_{EM} = 458-560 nm) and rhodamine channels (λ_{EX} = 560 nm, λ_{EM} = 560-7000 nm) respectively, in conditions of no Zn(II) added and Zn(II) added. The ratiometric response (I_{NAPTH} / I_{RHOD}) was determined for each cell and the average plotted in Fig 3(B).

References

1 G. R. C. Hamilton, Y. Sheng, B. Callan, R. F. Donnelly and J. F. Callan, *New Journal of Chemistry,* 2015, **39,** 3461.