Supporting Information

Nonconventional Luminescent Materials Exhibiting Water-Insensitive and pH-Sensitive Properties for Cell Imaging and Metal Ion Detection

Tiantian Miao,[a] Huili Wei,[b] Yudie Shan,[a] Zixuan Sun,[a] Dan Ning,[a] Yinyin Zhu,[a] Chanming Mei,[b] Bingli Jiang,[b] Xueyu Dou,[c*] and Yongyang Gong[a*]

[a] Guangxi Key Laboratory of Optical and Electronic Materials and Devices, Guangxi Colleges and Universities Key Laboratory of Natural and Biomedical Polymer Materials, College of Materials Science and Engineering, Guilin University of Technology, No.12 Jian'gan Rd., Qixing District, Guilin 541004, China. Email: yygong@glut.edu.cn

[b] Guangxi Key Laboratory of Drug Discovery and Optimization, College of Pharmacy, Guilin Medical University, No. 1 Zhiyuan Rd., Lingui District, Guilin 541199, China.

[c] Key Laboratory of Bio-Fibers and Eco-Textiles, Collaborative Innovation Center of Marine Biobased Fiber and Ecological Textile Technology, Institute of Marine Biobased Materials, College of Materials Science and Engineering, Qingdao University, Qingdao 266071, China. Email: xydou93@126.com

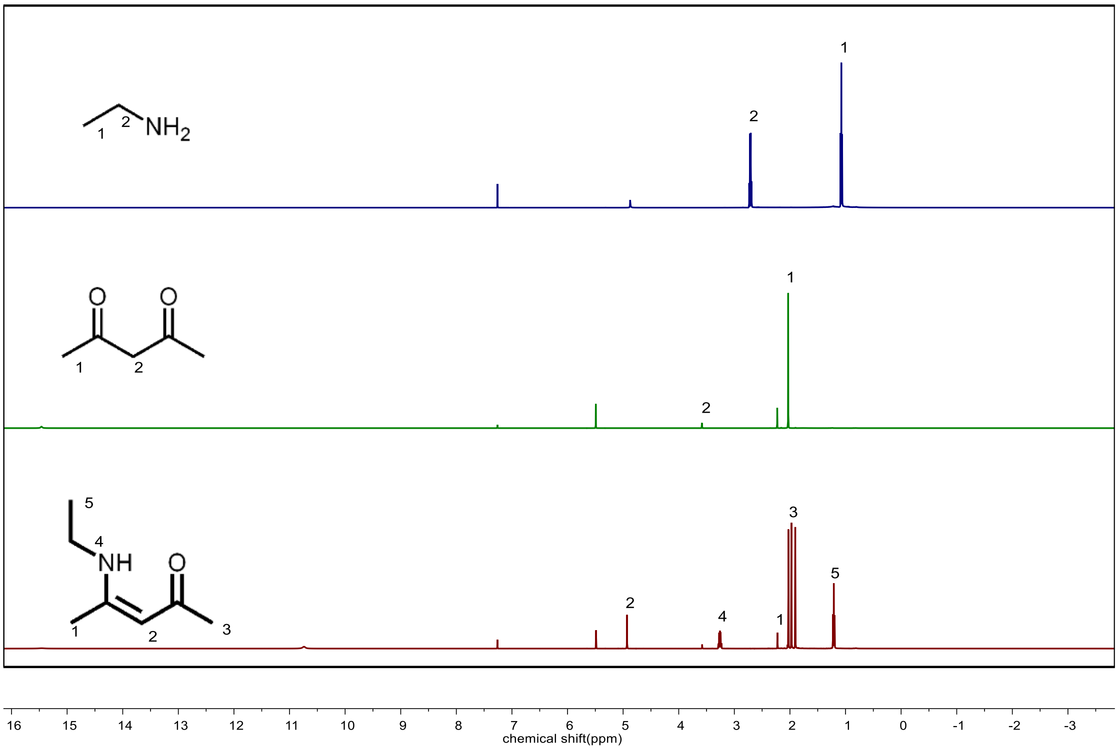

Figure S1. Comparison of ^{1}H NMR spectra between compound MA and its corresponding synthetic raw materials.

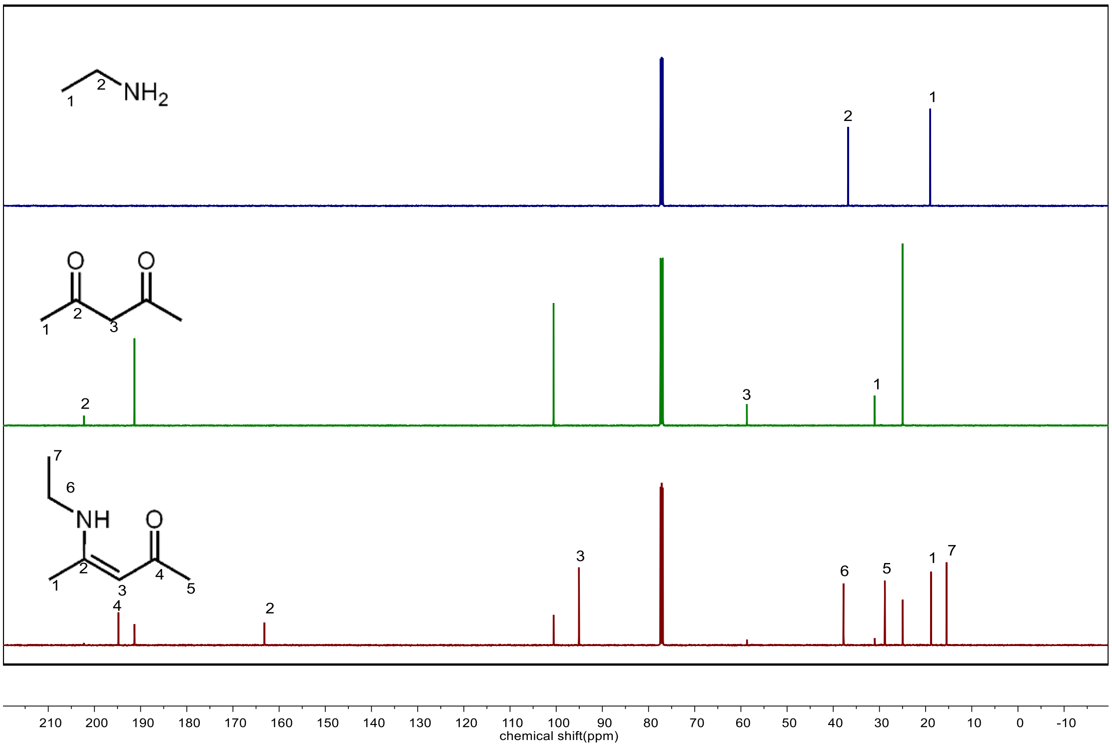

Figure S2. Comparison of ^{13}C NMR spectra between compound MA and its corresponding synthetic raw materials.

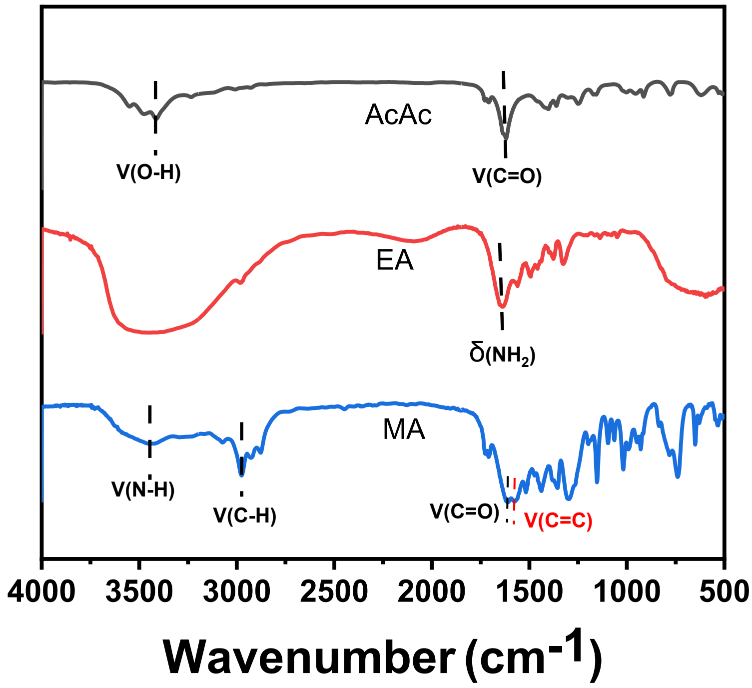

Figure S3. FT-IR spectrum of MA and the raw materials.

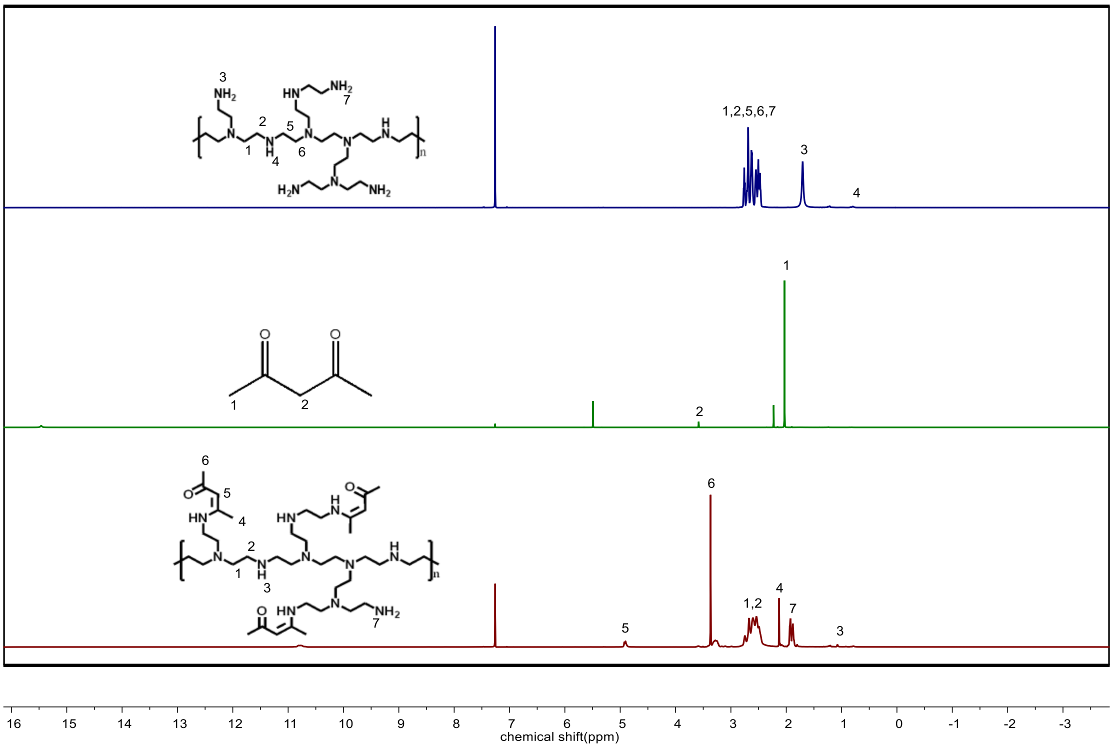

Figure S4. Comparison of ^{1}H NMR spectra between compound AP3-1 and its corresponding synthetic raw materials.

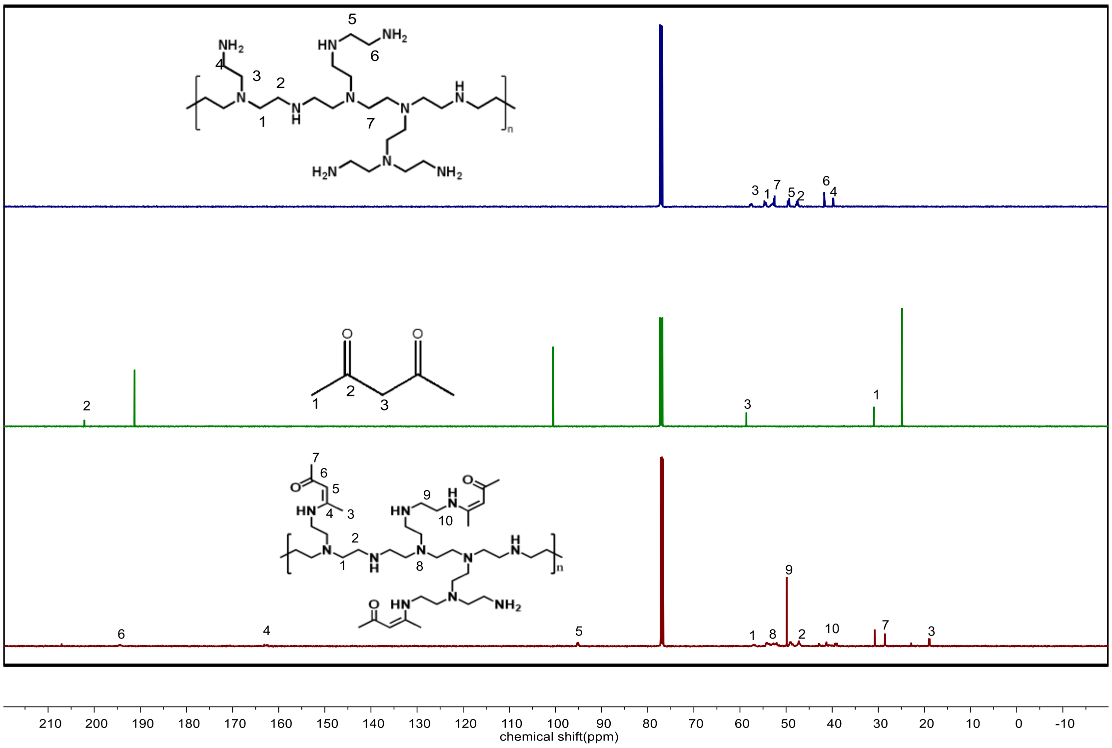

Figure S5. Comparison of ^{13}C NMR spectra between compound AP3-1 a nd its corresponding synthetic raw materials.

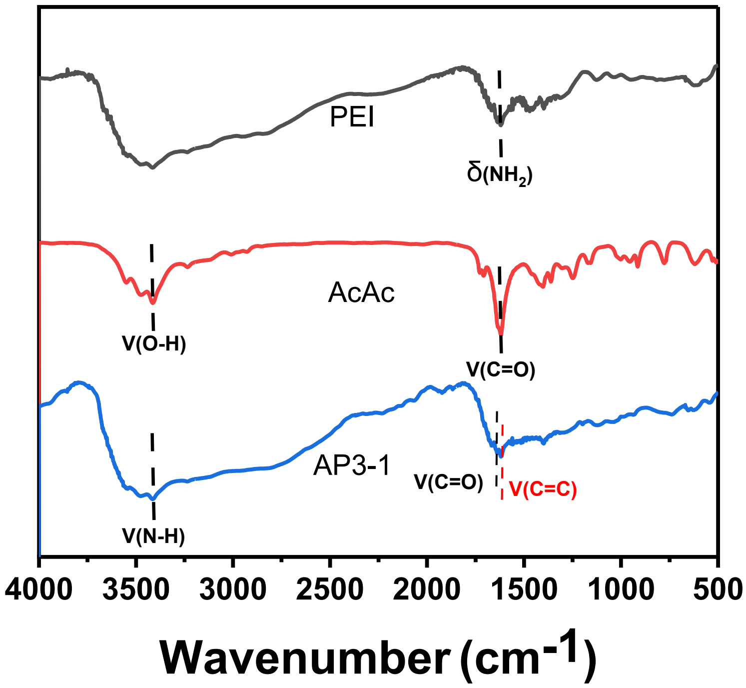

Figure S6. FT-IR spectrum of AP3-1 and the raw materials.

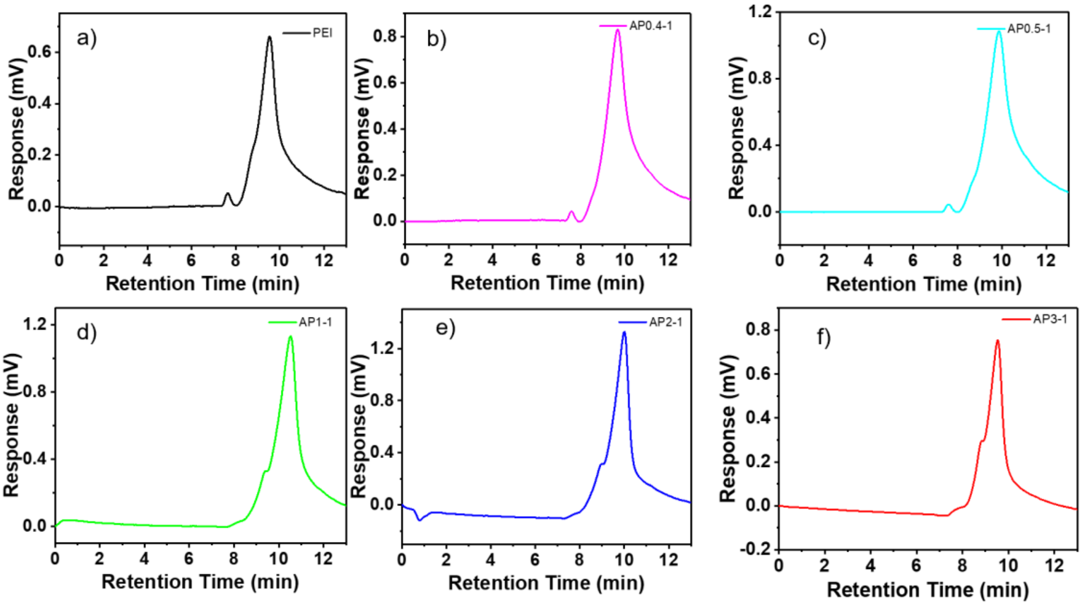

Figure S7. Gel permeation chromatography (GPC) trace of polymer PEI, AP0.4-1 AP0.5-1, AP1-1, AP2-1, AP3-1.

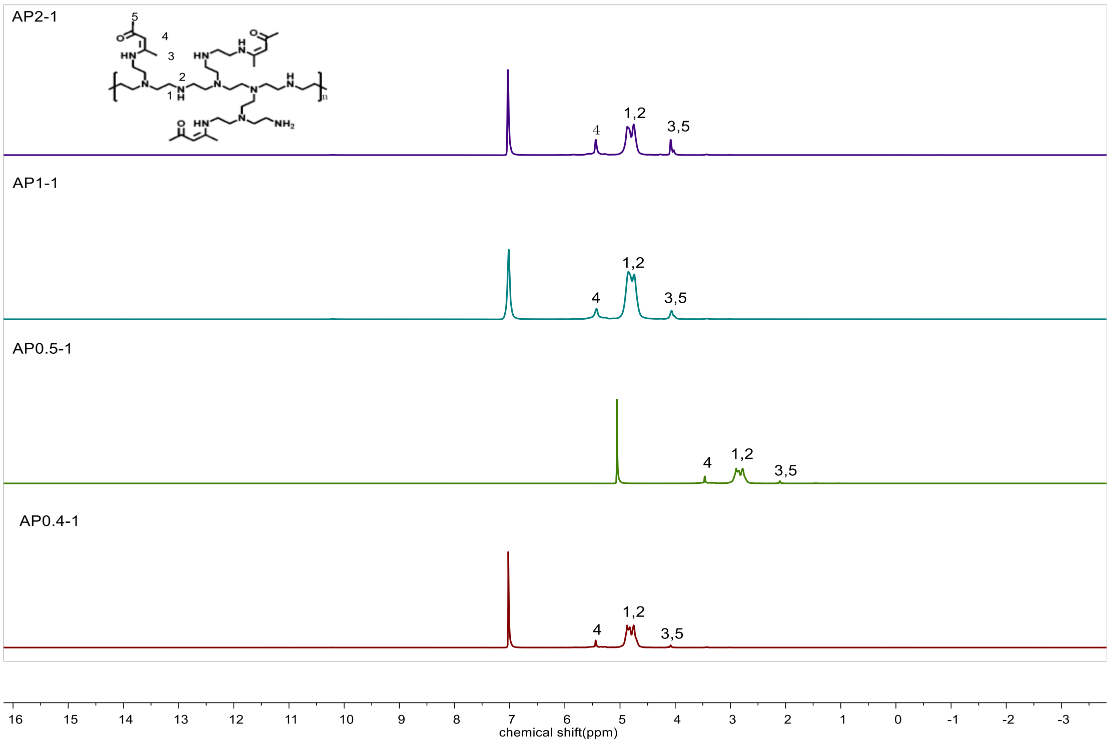

Figure S8. 1H NMR spectrum of AP0.4-1, AP0.5-1, AP1-1, AP2-1.

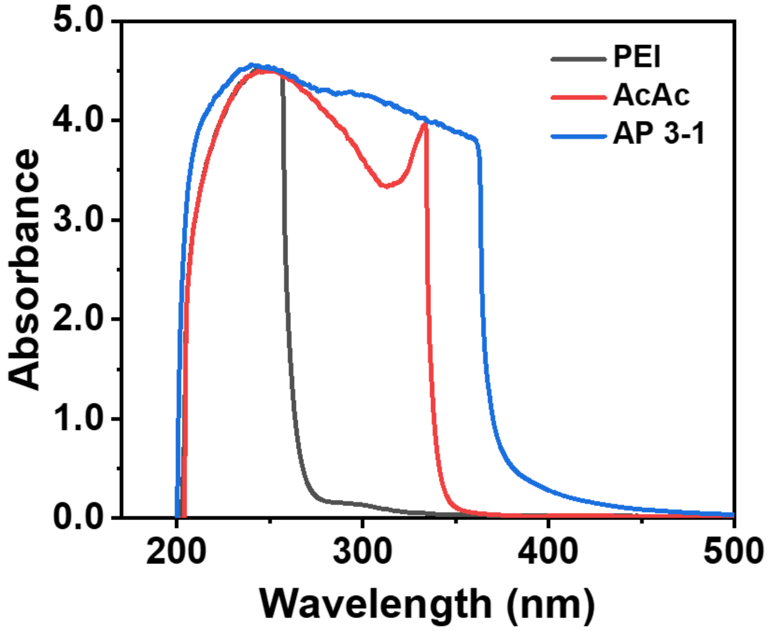

Figure S9. UV absorption spectra of the starting materials PEI and AcAc, and of the product AP3-1 at a concentration of 100 mg/mL.

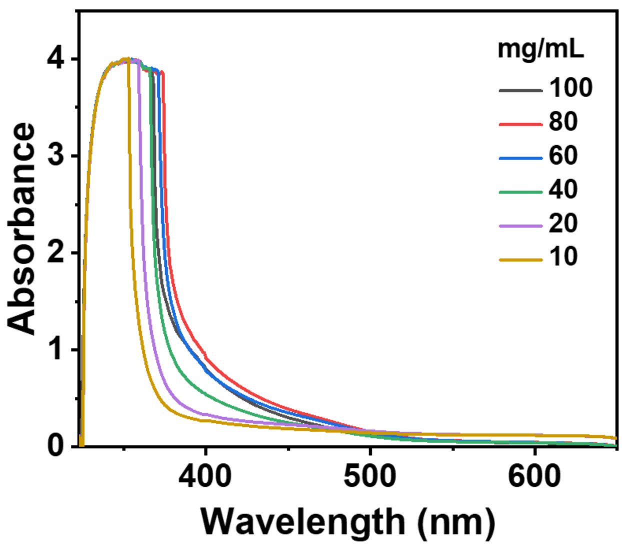

Figure S10. Absorption spectra of AP3-1 in ethanol solution at different concentrations.

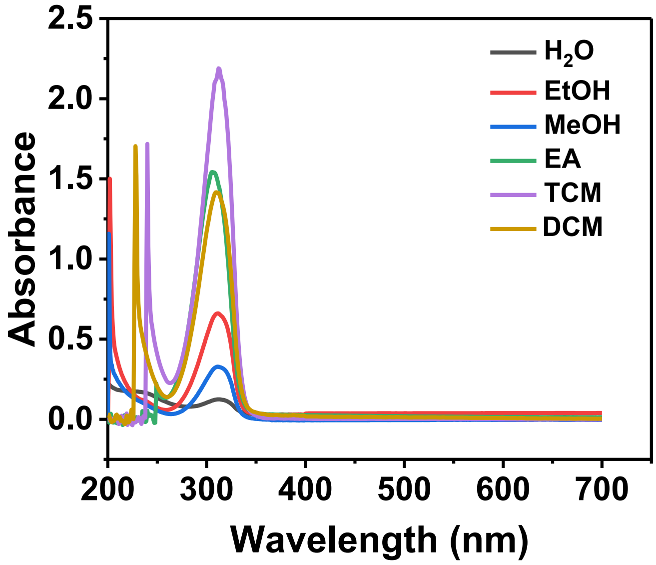

Figure S11. UV-Vis absorption spectra of AP3-1 (0.01 mg/mL) in different solvents.

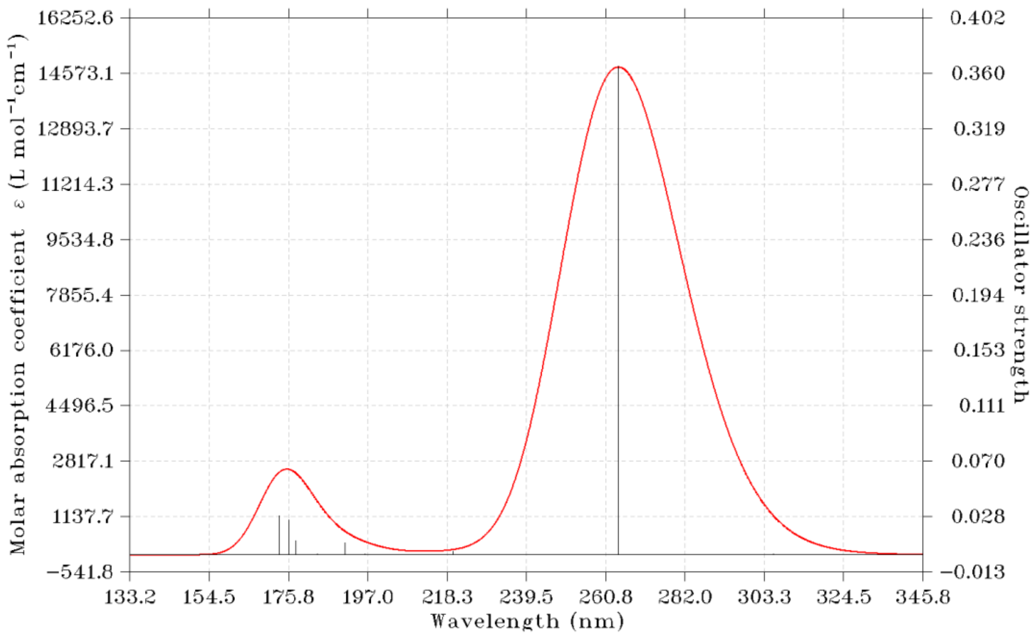

Figure S12. Oscillator strength and molar extinction coefficient of the model compound obtained from theoretical calculations.

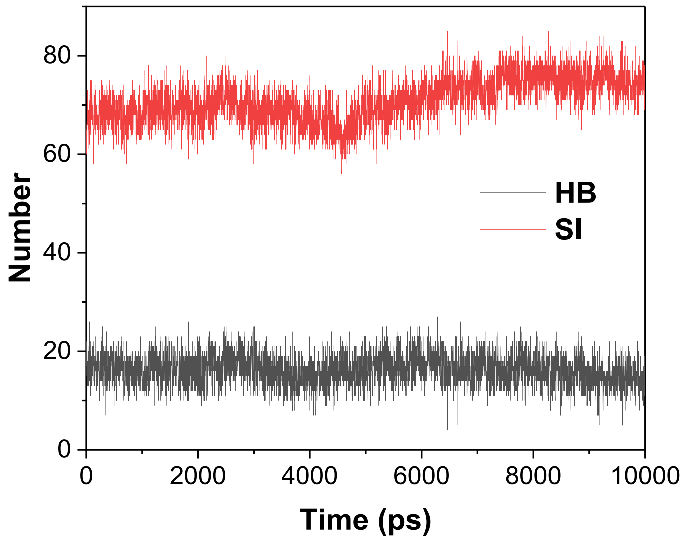

Figure S13. Molecular dynamics simulations showing the variation over time in the number of intra- and intermolecular hydrogen bonds and other short-range interactions within the model polymer cluster.

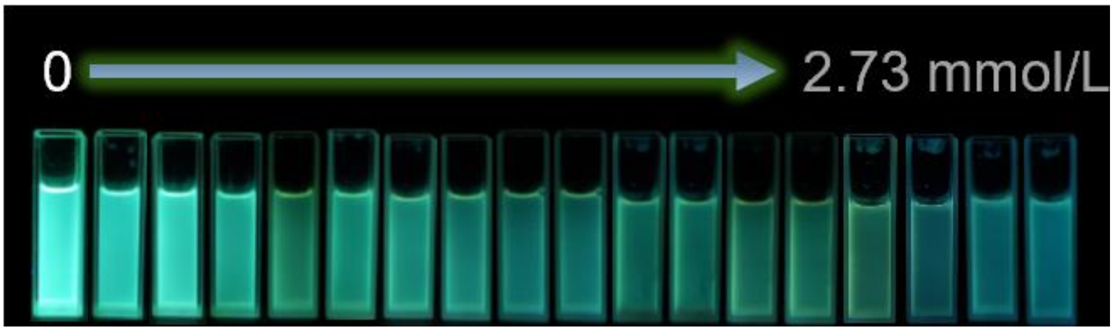

Figure S14. Fluorescence quenching photographs taken under 365 nm UV light after adding various concentrations of Co^{2+} ions.

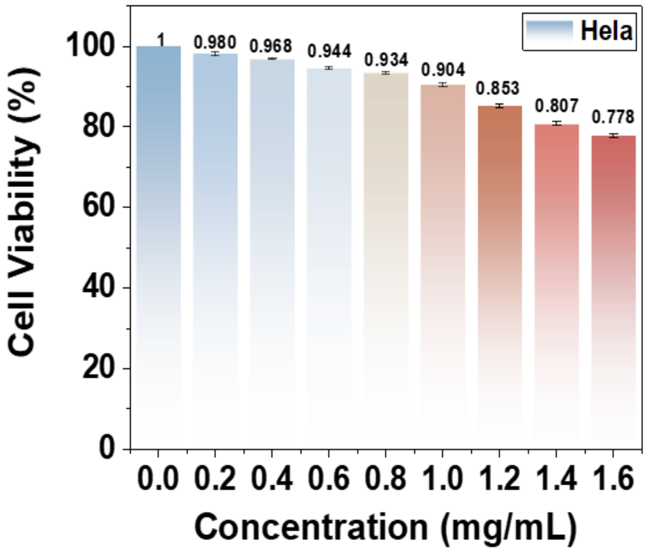

Figure S15. Cell viability of HeLa cells incubated with different concentrations of AP3-1 for 24h.

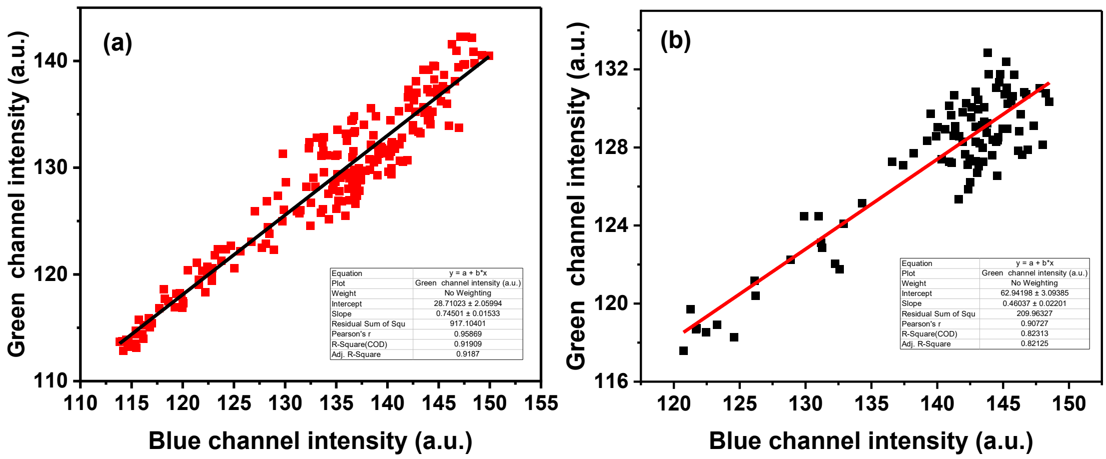

Figure S16. Signals were collected from the blue and green channel of Hela cell incubated with AP3-1 (a) and AP3-1+Co^{2+} (b) respectively.

Table S1. Molar mass characterization of PEI and AP.

Targets	M_n (kg/mol)	M_w (kg/mol)	M_z (kg/mol)	Đ
PEI	7.31	40.10	90.09	5.47
AP0.4-1	14.9	40.8	110.64	2.74
AP0.5-1	5.89	68.77	121.07	4.21
AP1-1	5.75	16.62	28.62	2.88
AP2-1	6.51	13.50	26.78	2.07
AP3-1	24.71	47.40	87.34	1.91

M_n: Number-average molar mass.
M_w: Weight-average molar mass.
M_z: Z-average molar mass.
Đ : M_w/M_n.

Table S2. Luminescent quantum yield in different solvents.

Solvent	τ_F [ns]	Φ_{PL} [%]
DCM	1.29	5.33
TCM	1.36	2.42
EA	1.52	3.93
EtOH	3.92	11.64
MeOH	2.15	7.02
H_2O	3.53	5.61

τ_F represent fluorescence lifetime, Concentration: 10 mg/mL. Φ_{PL} = The photoluminescence quantum yield, Concentration: 10 mg/mL