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

Supporting Information

Development of Optical Chemosensors based on Photochromic Polymer Nanocarriers

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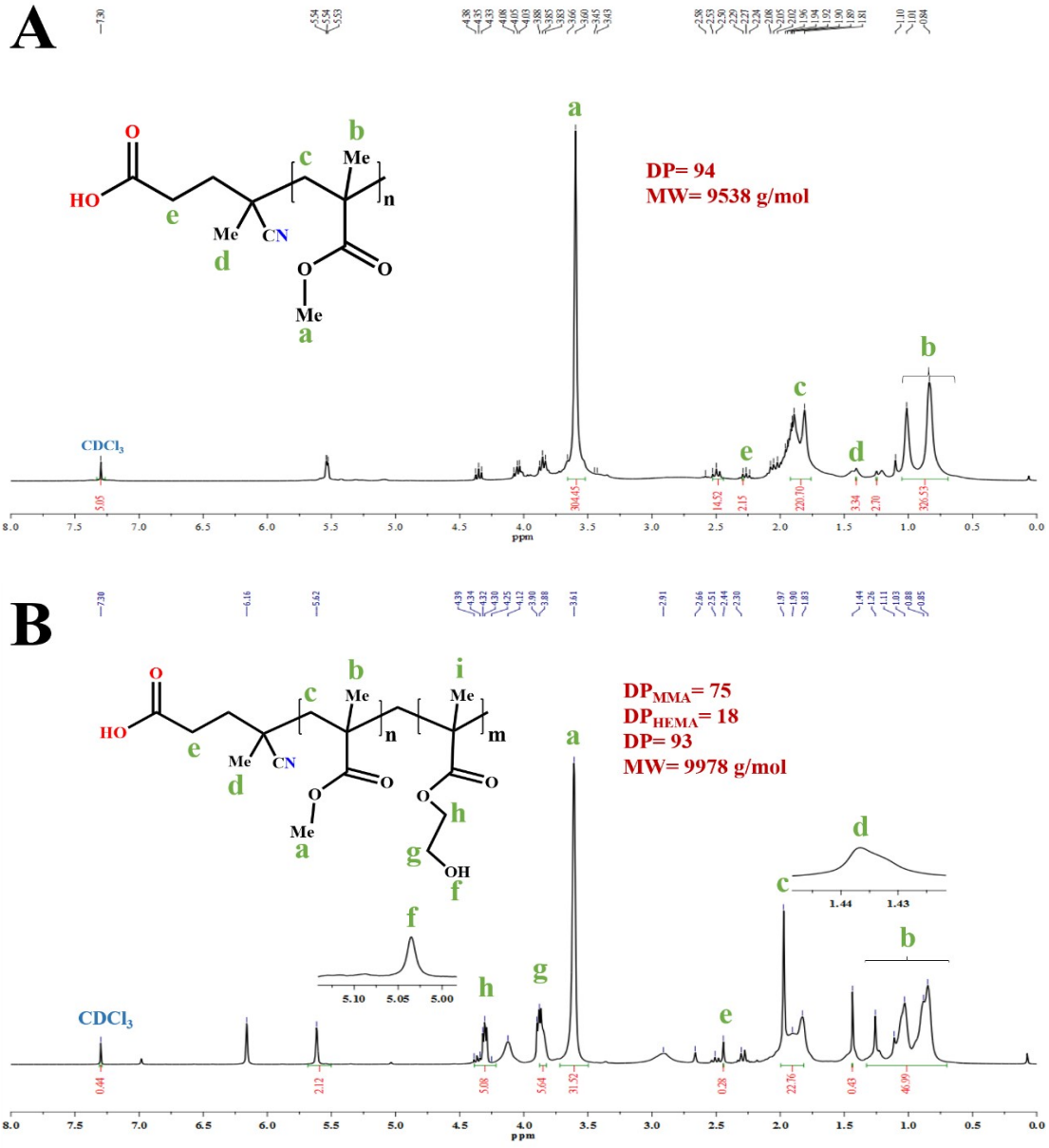
1. Characterization of the structures by ^{1}H NMR spectroscopy

Figure S1 shows the ^{1}H NMR spectra, degree of polymerization (DP), and chemical structure for all the samples.



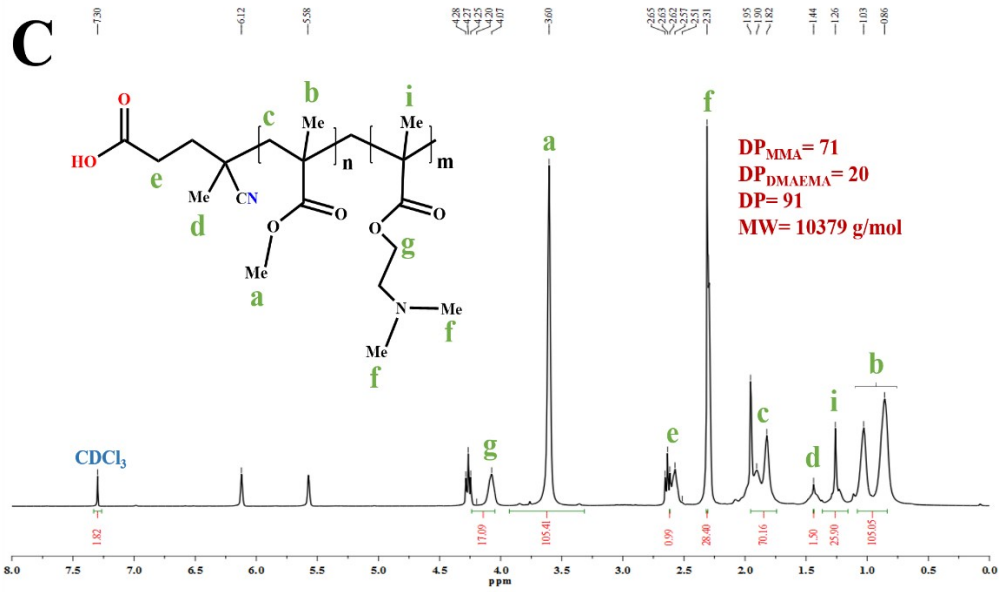


Figure S1. ^{1}H NMR spectra of (A) PMMA, (B) PMMA-*co*-PHEMA, and (C) PMMA-*co*-PDMAEMA in $CDCl_3$

2. SEC results

SEC analysis was used to study molecular weight and its distribution for PMMA, PMMA-*co*-PHEMA, and PMMA-*co*-PDMAEMA. Figure S2 shows the number-average molecular weight and polydispersity index for the polymers. The SEC traces of all the samples display monomodal peaks with the molecular weights near to the theoretical values. The results of ^{1}H NMR and SEC show that synthesis of the homo- and copolymers was successfully carried out by RATRP.

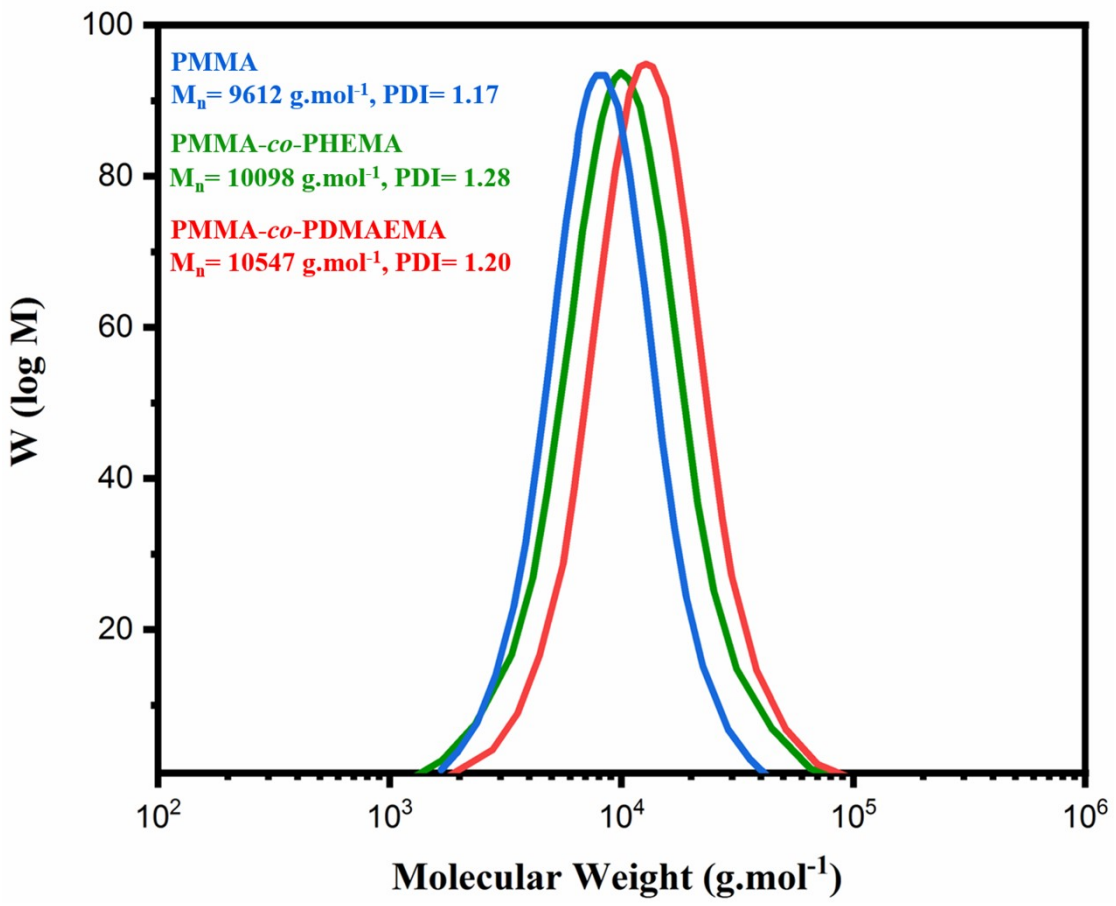


Figure S2. SEC traces for PMMA, PMMA-*co*-PHEMA, and PMMA-*co*-PDMAEMA

3. Estimation of the pH of an unknown sample

To detect pH of an unknown sample, a calibration curve was extracted. For this purpose, I/I_{max} data were linearly fitted at 5 acidic and 5 basic pHs by using the fluorescence emission results, as shown in Figure S3. The pHs 1 and 14 are not included in the calibration curve due to their lack of photochromic properties. In addition, the pHs 2 and 13 were not used in the linear fitting due to their scattering from the other data.

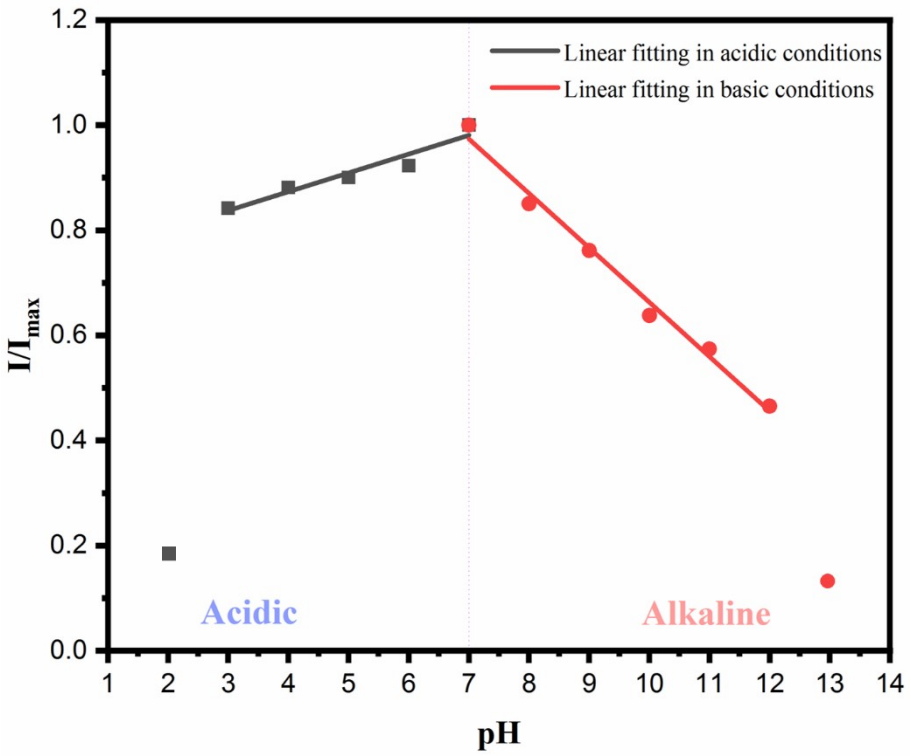


Figure S3. The calibration curve of I/I_{max} for the colloidal PMMA-*co*-PDMAEMA sample against pH

To estimate pH of an unknown acidic sample, its fluorescence spectrum was firstly taken. Then, based on the fluorescence spectroscopy and calibration curve, the pH of the unknown sample was calculated. Figure S4 shows that the amount of I/I_{max} of 0.87 yields the pH value of 3.46, which is in accordance with the result shown by the pH meter (3.48). This indicates that the colloidal PMMA-*co*-PDMAEMA sample could act as an optical chemosensor to show pH.

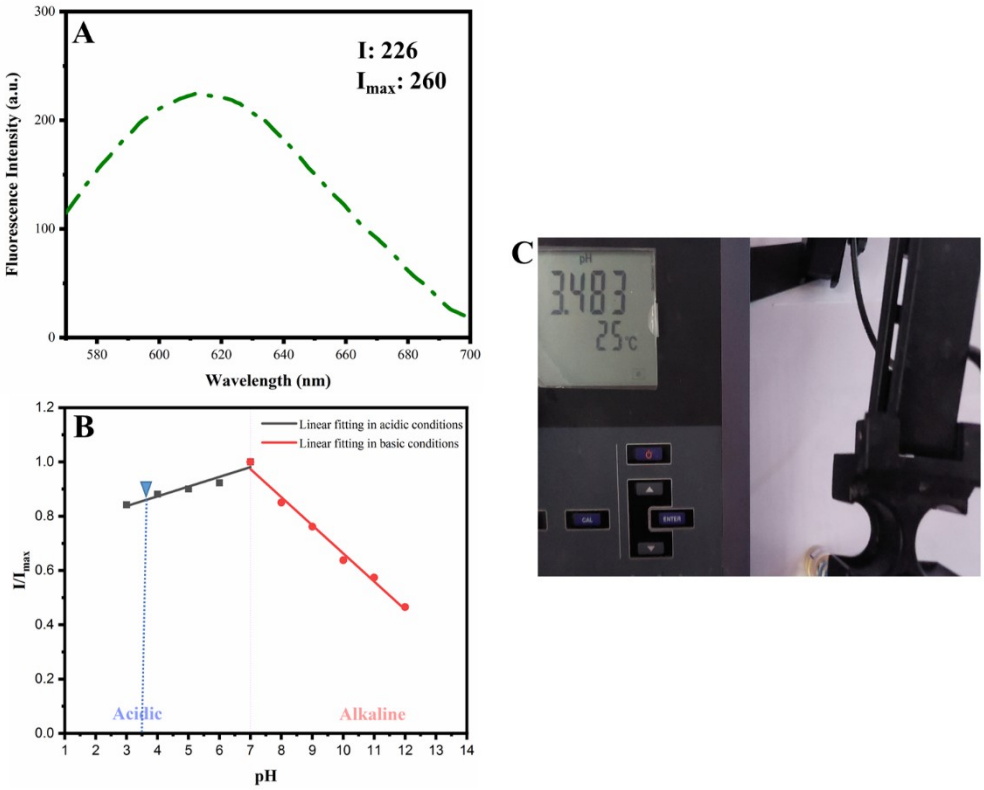


Figure S4. Estimation of the pH of an unknown acidic sample: A) Fluorescence emission spectra of the unknown sample, B) calculation of pH from the calibration curve, and C) pH of the unknown sample shown by pH meter