

Supporting Information

Multiple Logic Fluorescent Thermometer System Based on *N*-isopropyl Methacrylamide Copolymer Bearing Dicyanomethylene-4*H*-pyran Moiety

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The value of $m / n = 275 / 1$ in $\text{poly}(\text{NIPMAM}_m\text{-co-MDCPDP}_n)$ can be calculated with below two equations:

$$Y_{\text{Abs}} = 0.01743 + 29180 \times C_{\text{MDCPDP}} \quad (1) \text{ (From Figure S2)}$$

$$M_{\text{poly}(\text{NIPMAM-co-MDCPDP})} = M_{\text{NIPMAM}} + M_{\text{MDCPDP}} \quad (2)$$

$$Y_{\text{abs}} = 0.8310 \text{ (From the absorbance of 1.0 g/l poly(NIPMAM-co-MDCPDP) at 460 nm Figure S3)}$$

$$\text{So in Equation 1: } C_{\text{MDCPDP}} = 2.788 \times 10^{-5} \text{ M} \quad M_{\text{MDCPDP}} = 1.943 \times 10^{-2} \text{ g/l}$$

$$M_{\text{NIPMAM}} = M_{\text{poly}(\text{NIPMAM-co-MDCPDP})} - M_{\text{MDCPDP}} = 0.9806 \text{ g/l} \quad C_{\text{NIPMAM}} = 7.721 \times 10^{-3} \text{ M}$$

$$m / n = C_{\text{NIPMAM}} / C_{\text{MDCPDP}} = 275 / 1$$

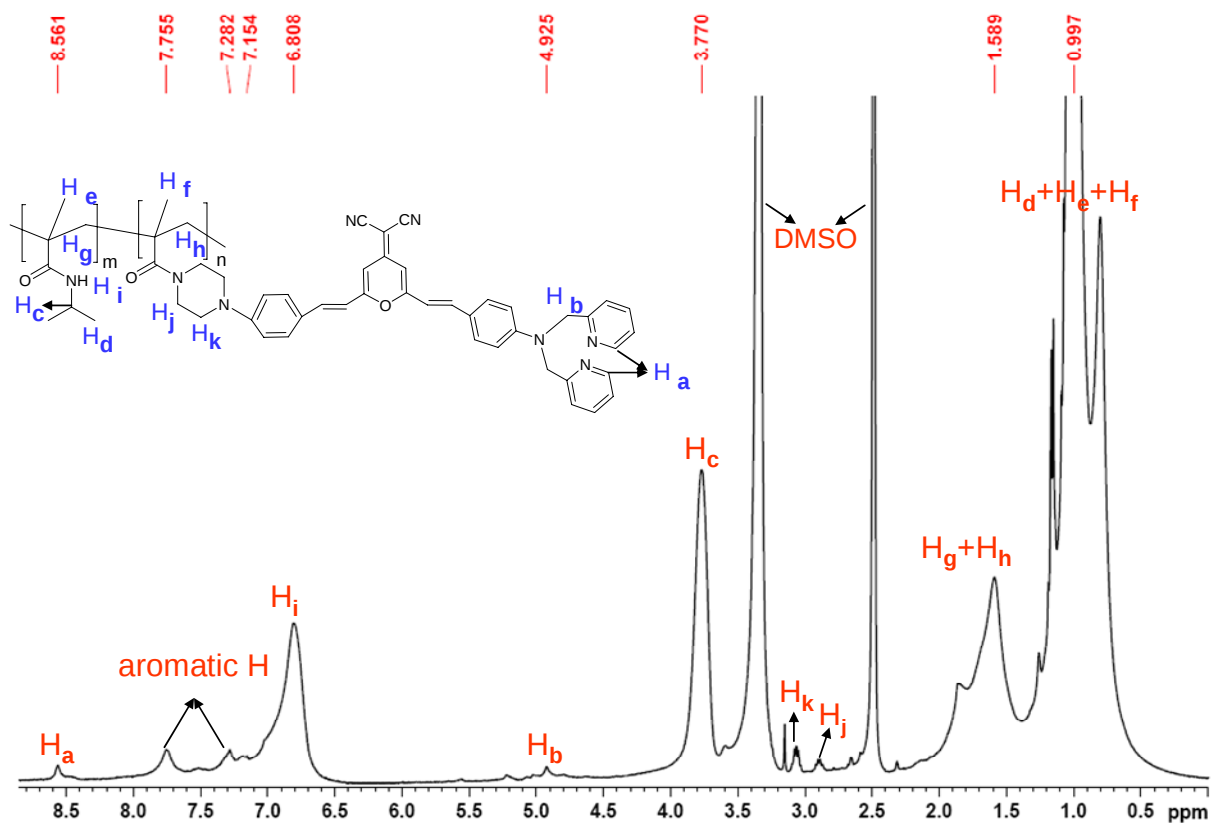


Figure S1. ^1H NMR spectrum of poly(NIPMAM-co-MDCPDP) in $\text{DMSO-}d_6$ at 25°C .

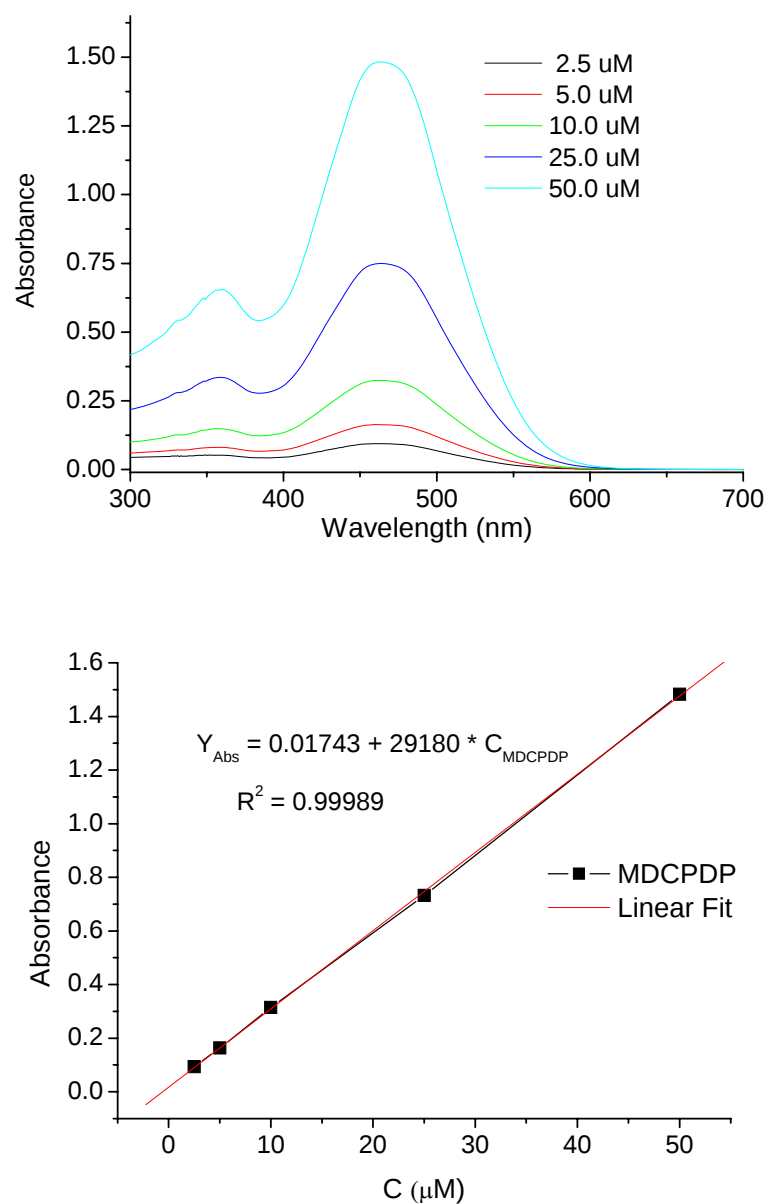


Figure S2. Absorption spectra of monomer MDCPDP (2.5, 5.0, 10.0, 25.0 and 50.0 μM) in ethanol solution and the linear fit of the absorbance at $\lambda_{\text{abs}} = 460 \text{ nm}$ (pH = 7, 25 $^{\circ}\text{C}$).

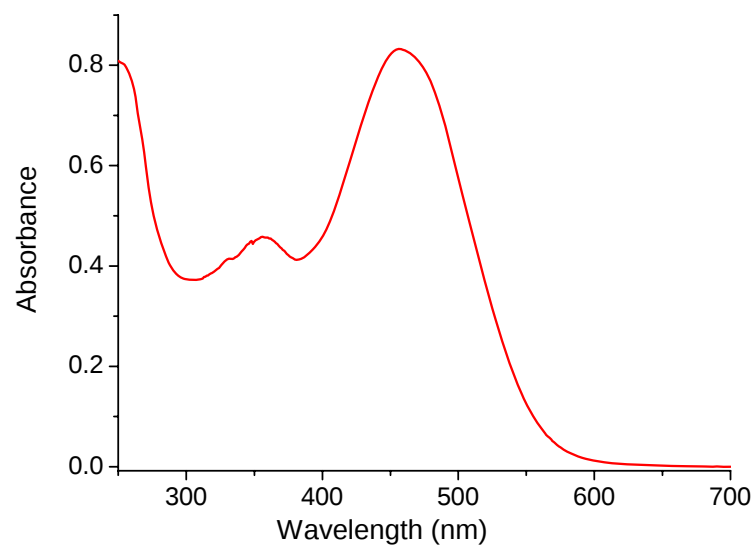


Figure S3. Absorption spectrum of poly(NIPMAM-*co*-MDCPDP) in ethanol solution at pH = 7 (1.0 g/L, 25 °C).

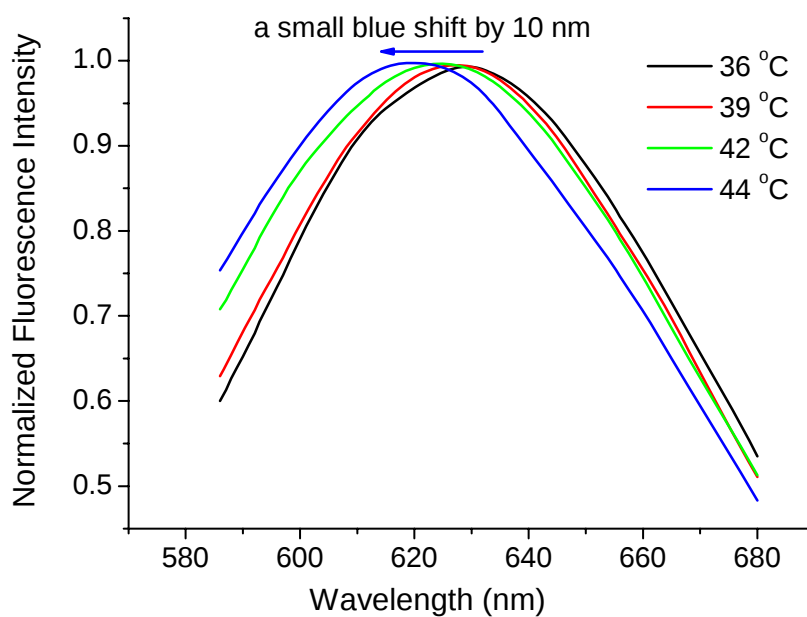


Figure S4. Normalized fluorescence temperature diagram of poly(NIPMAM-*co*-MDCPDP) (1.6 g/L) in water-ethanol (5: 1, v / v) solution at pH = 7. Note: the fluorescent emission peak shows a small hypsochromic shift by about 10 nm upon heating from 36 to 44 °C due to the decreased microenvironmental polarity near DCPDP unit.

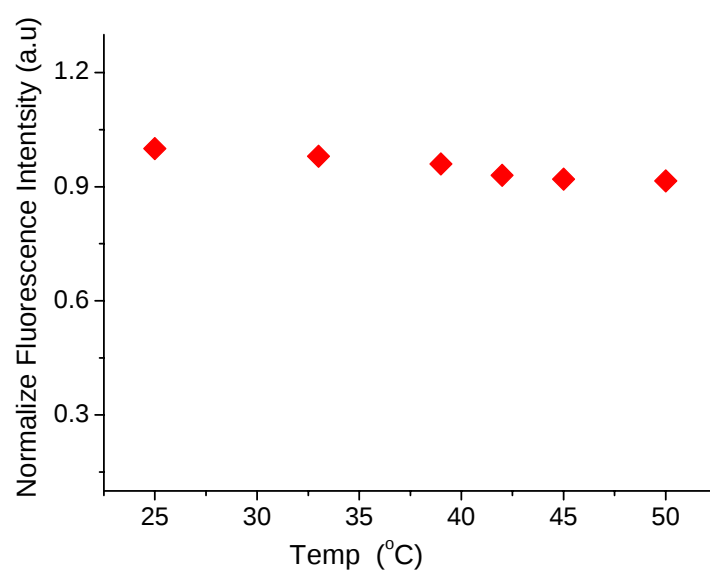


Figure S5. Fluorescence intensity-temperature of monomer MDCPDP (28 μM) in a mixture of water-ethanol (5 : 1, v / v) solution at pH = 7.

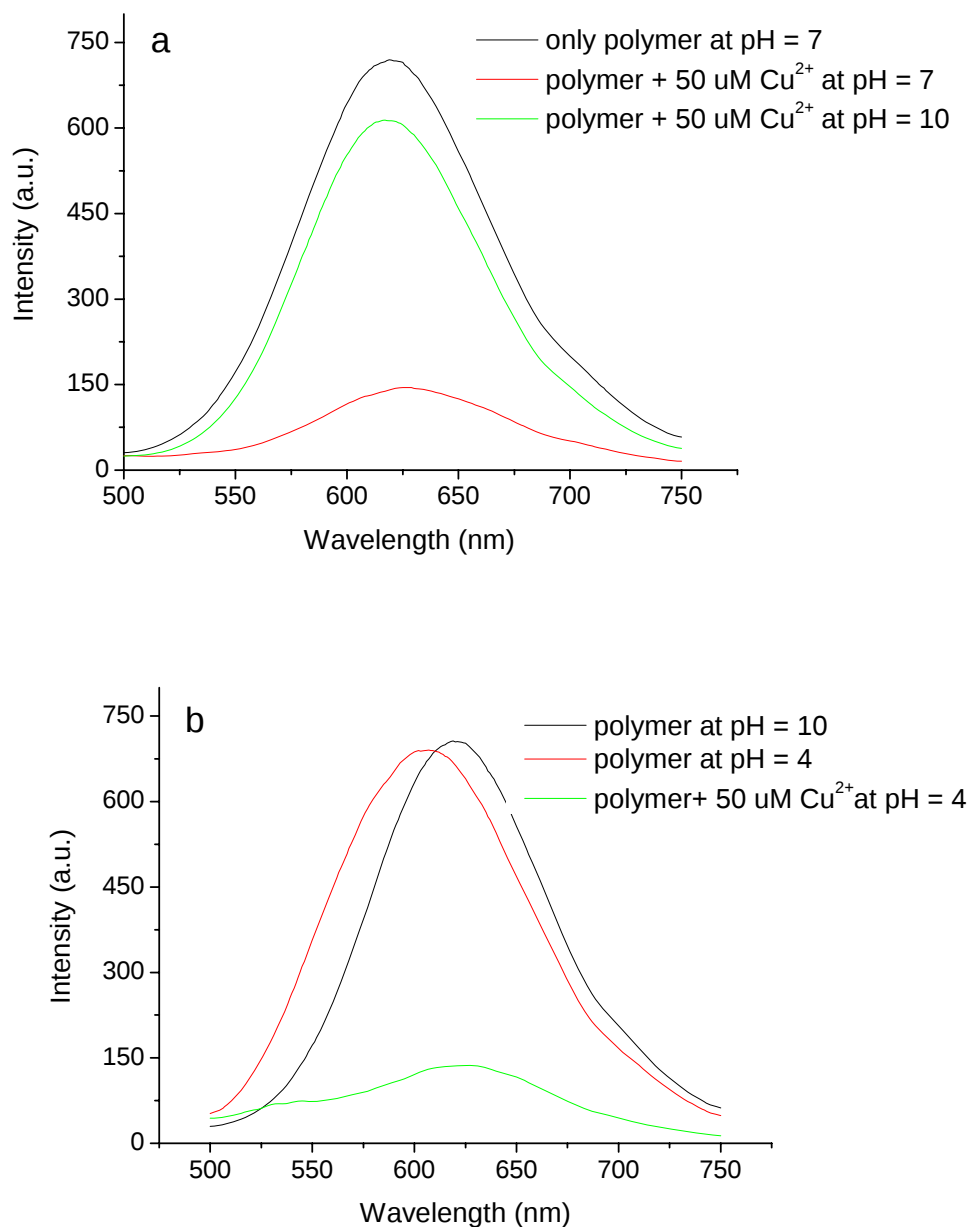


Figure S6. Fluorescence intensity of poly(NIPMAM-*co*-MDCPDP) (1.6 g/L) in a mixture of water-ethanol (5: 1, v / v) solution (a): pH = 7 and pH = 10; (b): pH = 4 and pH = 10 with the addition of 50 uM Cu^{2+} at room temperature 25 °C.

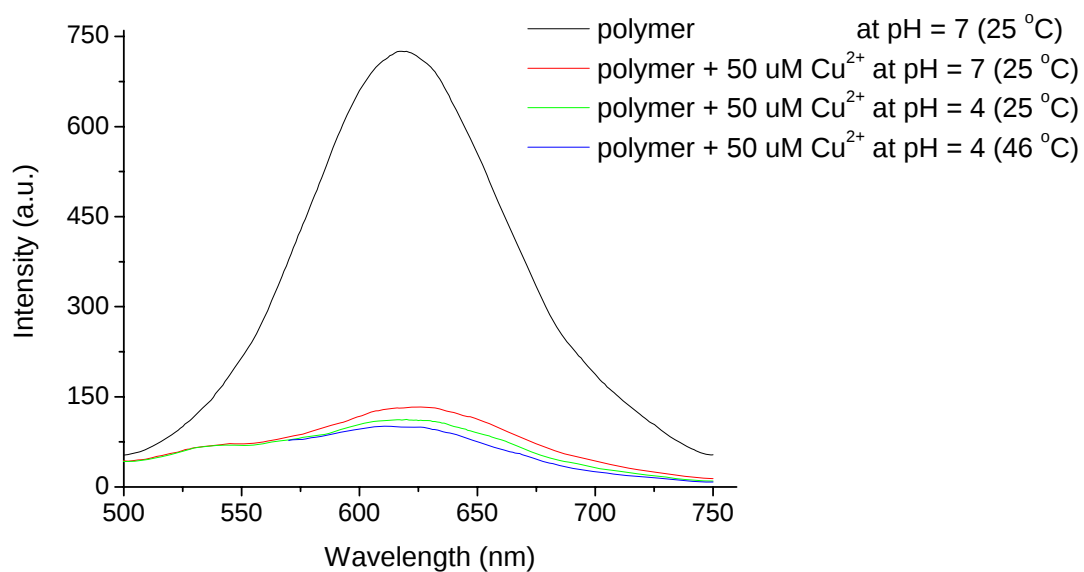


Figure S7. Fluorescence intensity-temperature of poly(NIPMAM-*co*-MDCPDP) (1.6 g/L) in a mixture of water-ethanol (5: 1, v / v) solution with the addition of 50 uM Cu²⁺ at pH = 4 and pH = 7.

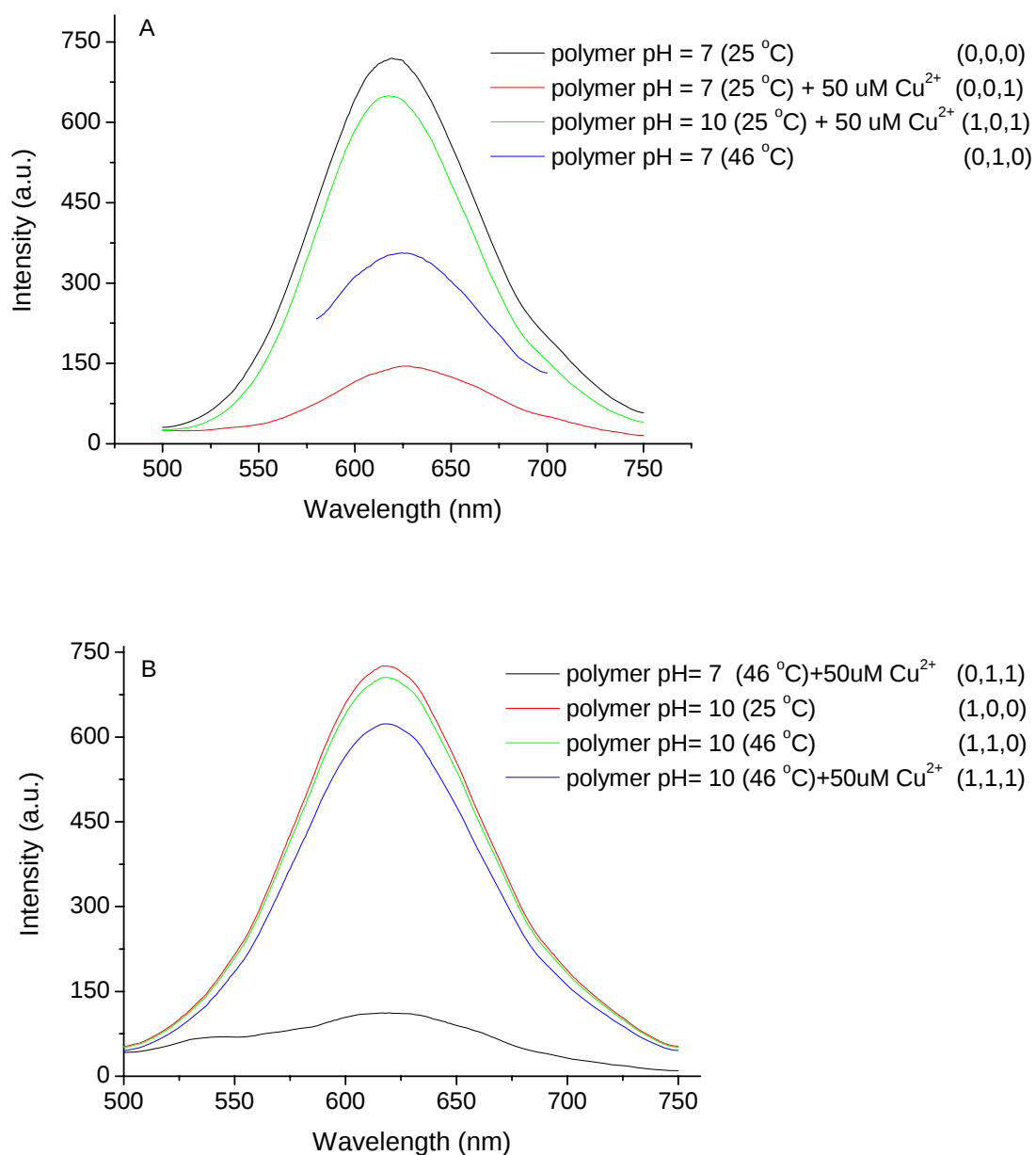


Figure S8. Fluorescence intensity of the eight output of the combinational serial NOR logic operation