Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

Multi-responsive γ-Methylene-γ-Butyrolactone/*N*-Vinyl Caprolactam Copolymers Involving pH-depend Reversible Lactonization

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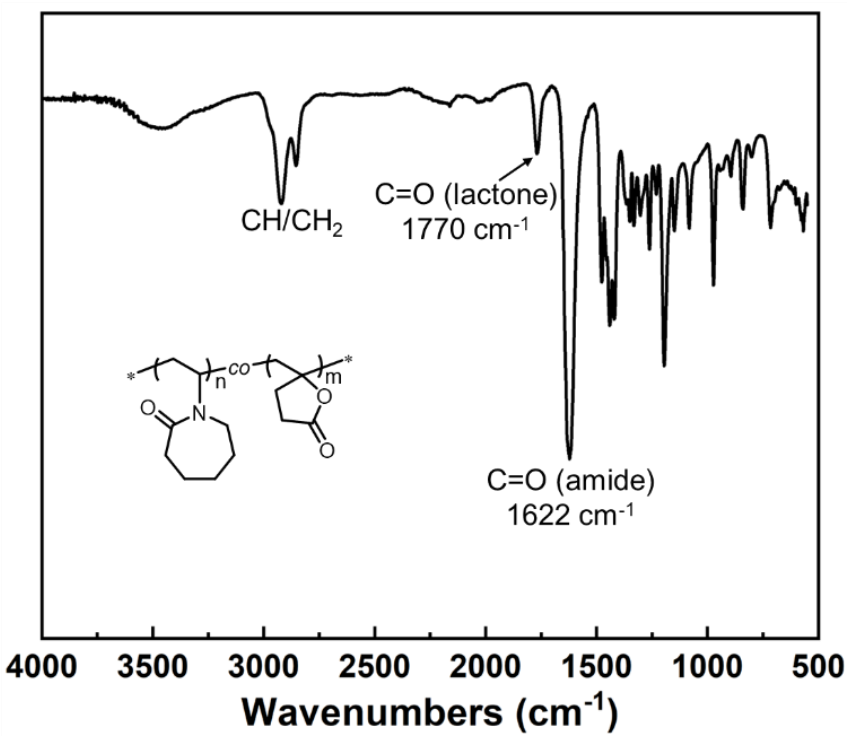

Figure S1. FT-IR spectrum of P(*N*VCL-*co*-γMγBL) (M_n= 20000 g/mol, $F_{\gamma M\gamma BL}$=0.05) prepared by conventional radical polymerization (Table 1, entry 1).

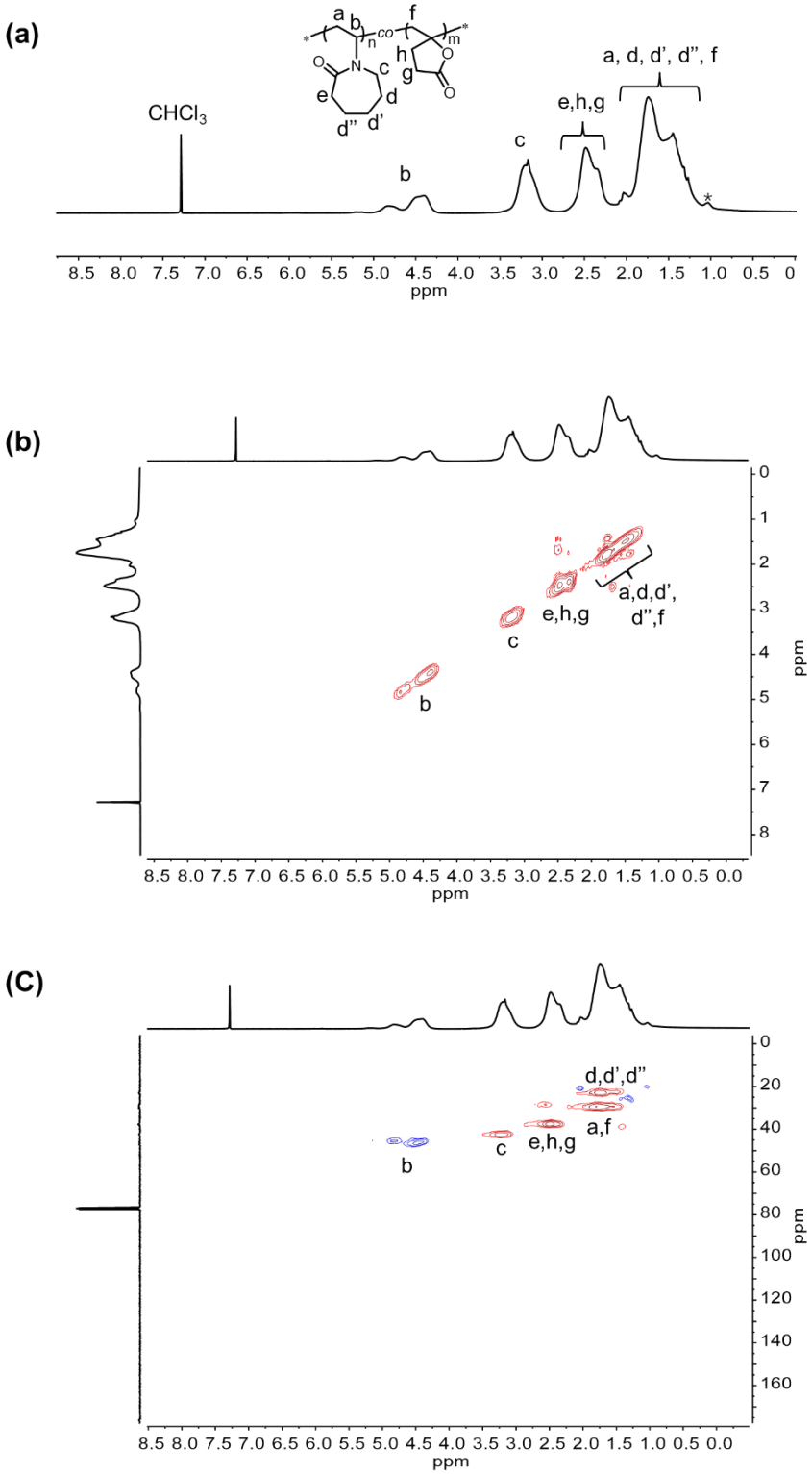

Figure S2.(a) ^{1}H NMR, (b) COSY and (c) HSQC of P(NVCL-*co*-γMγBL) (M_n = 11500 g/mol, $F_{\gamma M\gamma BL}$ = 0.1) prepared by OMRP (Table 2, entry 4). *^{1}H signal of the methyl groups of the initiating fragment R (R= -C(CN)(CH_3)-CH_2-C(CH_3)$_2$OCH_3).

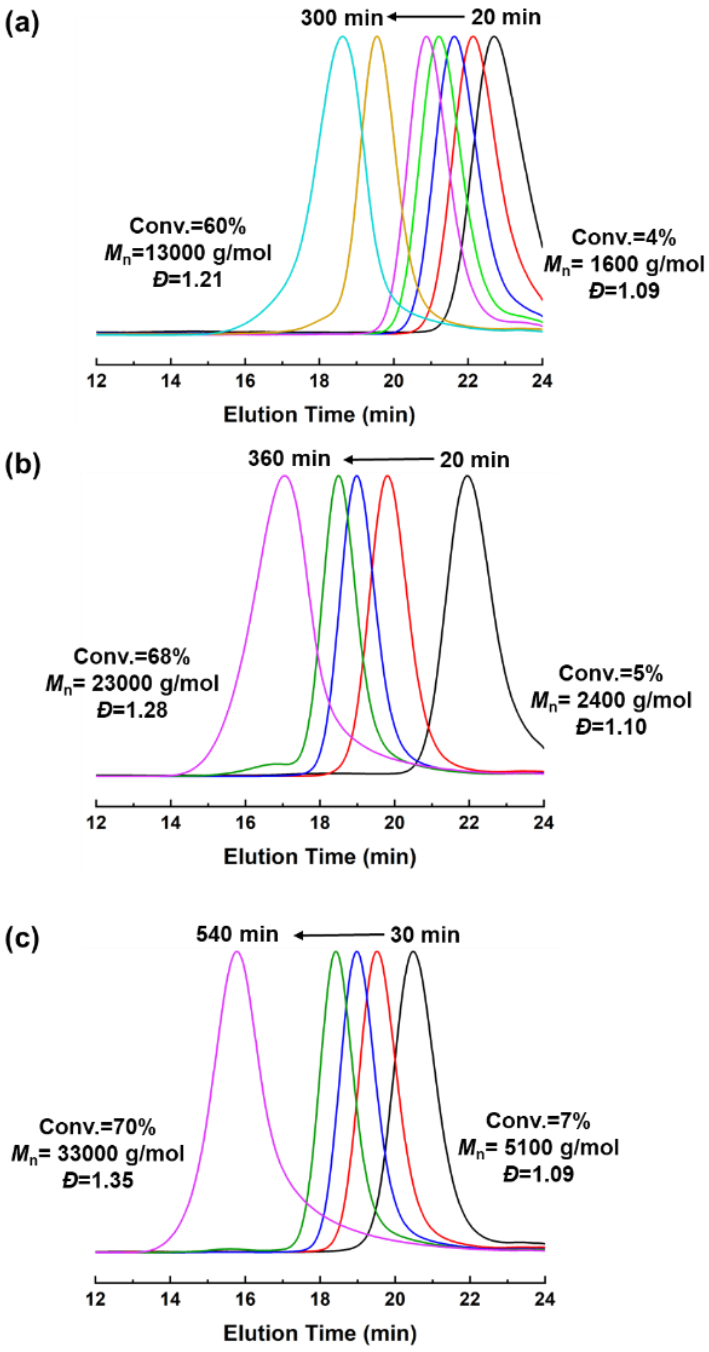

Figure S3. Overlay of SEC traces for the OMRP of *N*VCl and γMγBL with different monomers/RCo molar ratios: (a) $[monomers]_0/[R\text{-}Co(acac)_2]_0$=250/1, (b) $[monomers]_0/[R\text{-}Co(acac)_2]_0$= 500/1, (c) $[monomers]_0/[R\text{-}Co(acac)_2]_0$=750/1. ($f^\circ_{\gamma M\gamma BL}$ = 0.1, Table 2 entries 1-3).

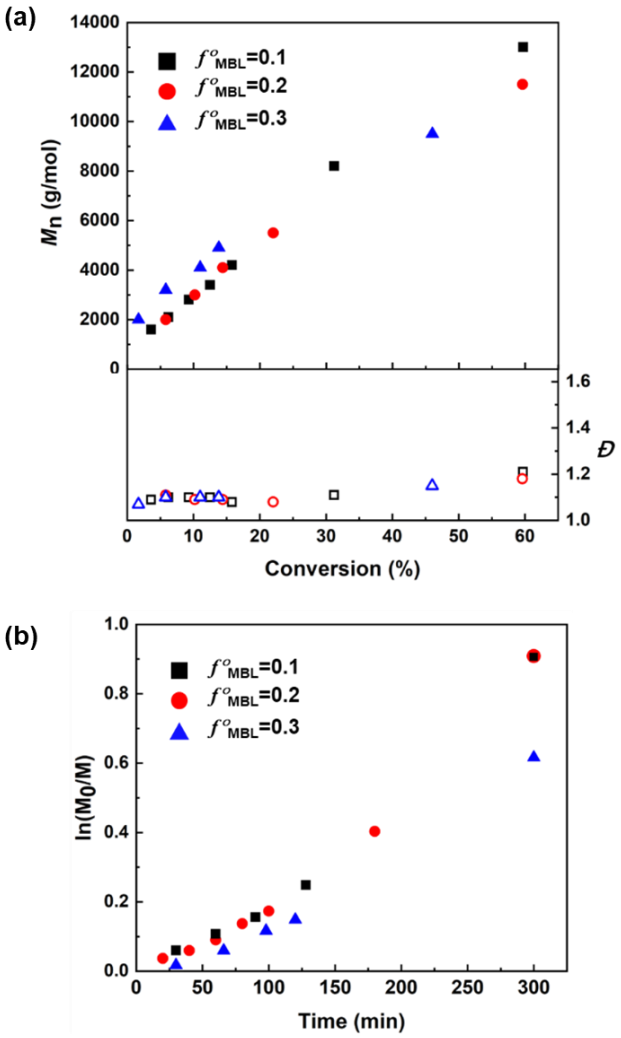

Figure S4. (a) Dependence of M_n (full symbols) and *Đ* (hollow symbols) on the total monomers conversion and (b) time dependence of ln(M_0/M) for the OMRP of *N*VCL/*γ*M*γ*BL with different feed ratio: ■ [*N*VCL]$_0$/[*γ*M*γ*BL]$_0$=0.9/0.1, ● [*N*VCL]$_0$/[*γ*M*γ*BL]$_0$ =0.8/0.2, ▲ [*N*VCL]$_0$/[*γ*M*γ*BL]$_0$=0.7/0.3 ([comonomers]$_0$/[R-Co(acac)$_2$]$_0$=250/1, Table 2 entries 1, 4 and 5).

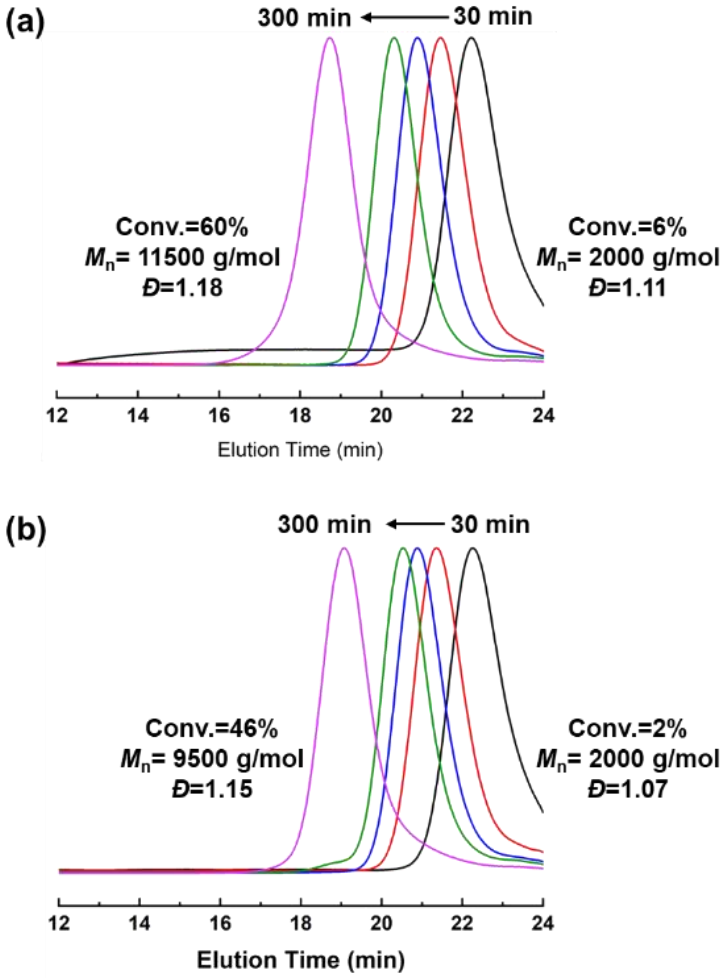

Figure S5. Overlay of SEC traces for the OMRP of *N*VCl and *γ*M*γ*BL with different feed compositions: a) $[N\text{VCl}]_0/[\gamma\text{M}\gamma\text{BL}]_0$=0.8/0.2, b) $[N\text{VCl}]_0/[\gamma\text{M}\gamma\text{BL}]_0/[\text{R-Co(acac)}_2]_0$=0.7/0.3. ($[\text{comonomers}]_0/[\text{R-Co(acac)}_2]_0$=250/1, Table 2 entries 4 and 5).

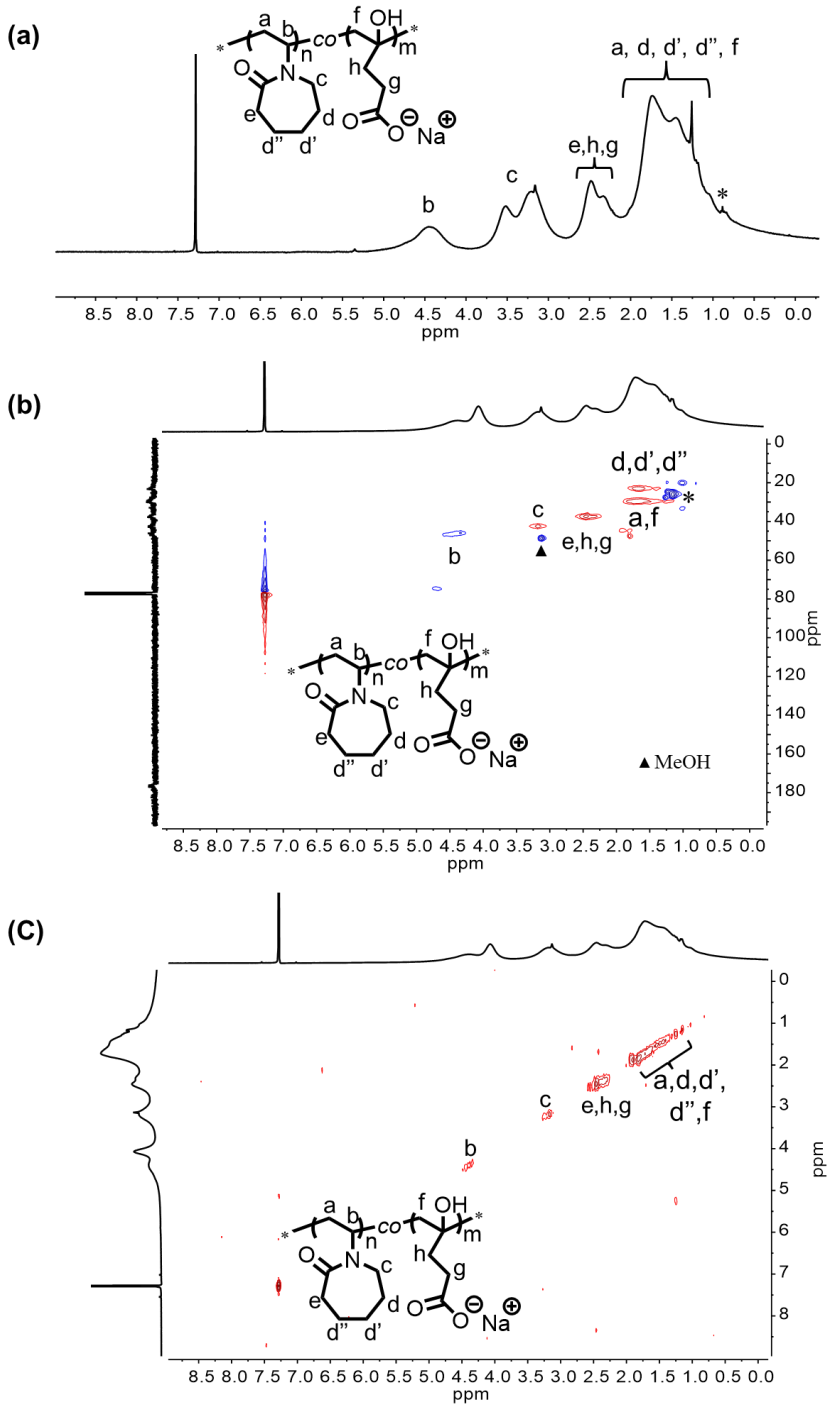

Figure S6. (a) ^{1}H NMR, (b) HSQC and (c) COSY of P(NVCL-*co*-HPEA) (Precursor: P(NVCL-*co*-γMγBL) (M_n = 11500 g/mol, $F_{\gamma M\gamma BL}$ = 0.1) prepared by OMRP (Table 2, entry 4). *^{1}H signal of the methyl groups of the R initiating fragment (R= -C(CN)(CH_3)-CH_2-C(CH_3)$_2$OCH_3).

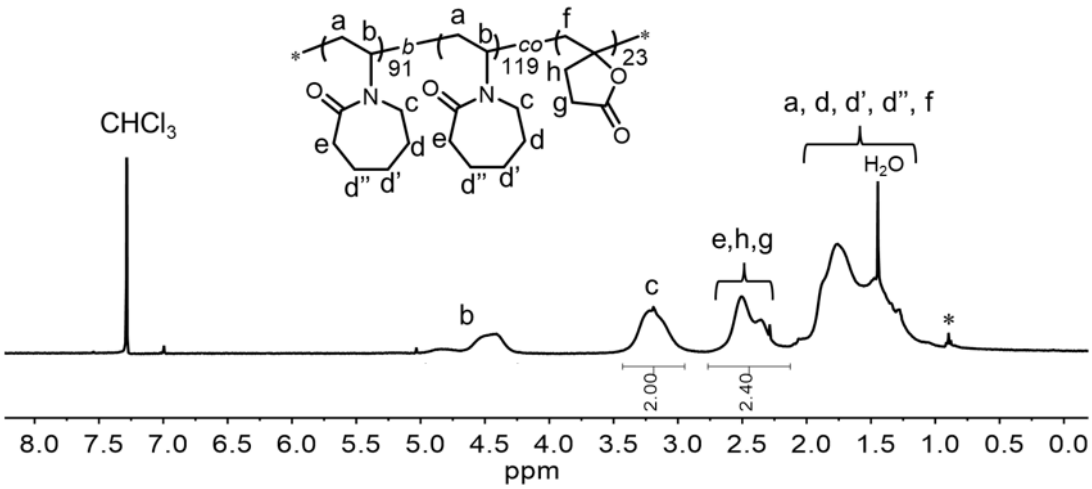

Figure S7. ^{1}H NMR spectrum of P(*N*VCL)$_{91}$-*b*-P(*N*VCL$_{119}$-*co*-γMγBL $_{23}$). *^{1}H signal of the methyl groups of the R initiating fragment (R= -C(CN)(C$\underline{H}_3$)-CH$_2$-C(C$\underline{H}_3$)$_2$OCH$_3$).

Table S1. Surface zeta potential of P(*N*VCL)$_{91}$-*b*-(*N*VCL$_{119}$-*co*-HPEA$_{23}$) particles in aqueous solution (5mg/mL) at different temperatures.

Temperature (°C)	65	70	80
Zeta potential (mV)	-41.04	-51.85	-55.25