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Supplementary Data

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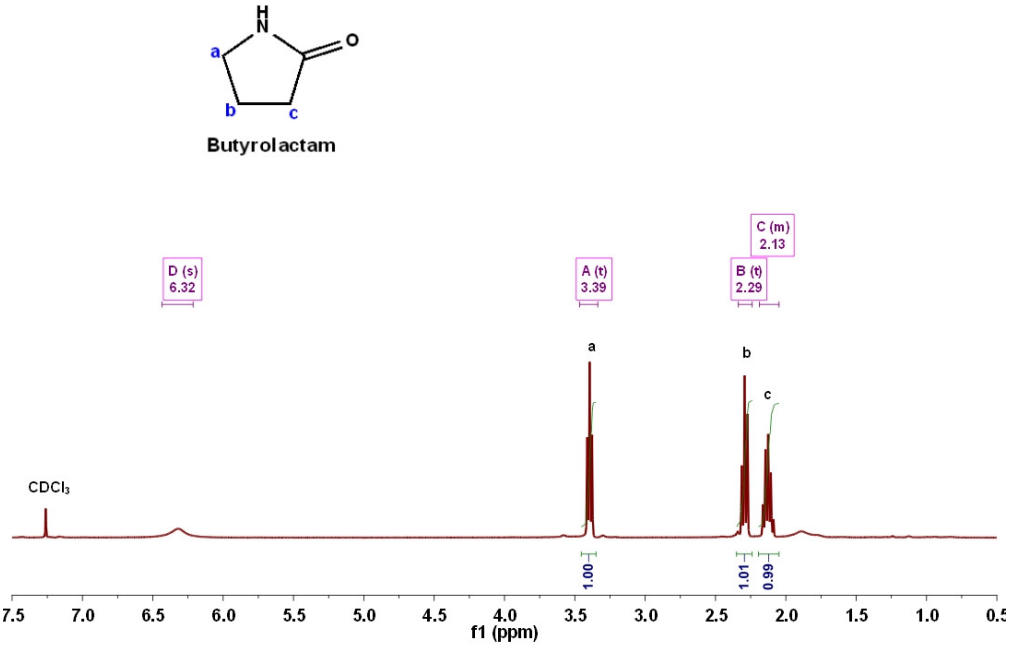

Figure. S1. ^{1}H NMR spectrum of butyrolactam

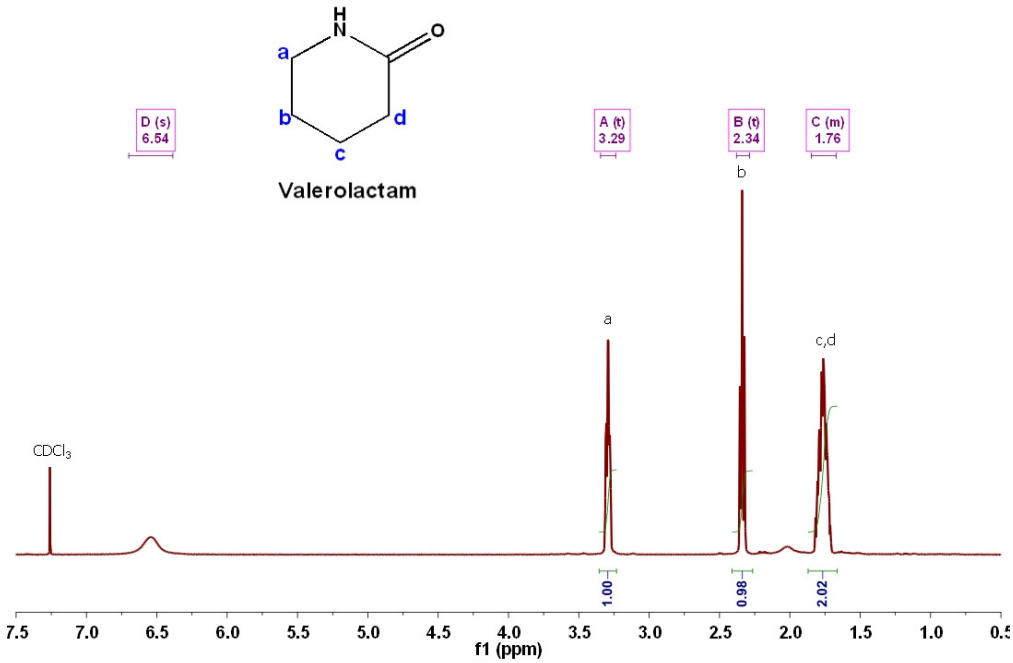

Figure. S2. ^{1}H NMR spectrum of δ-valerolactam

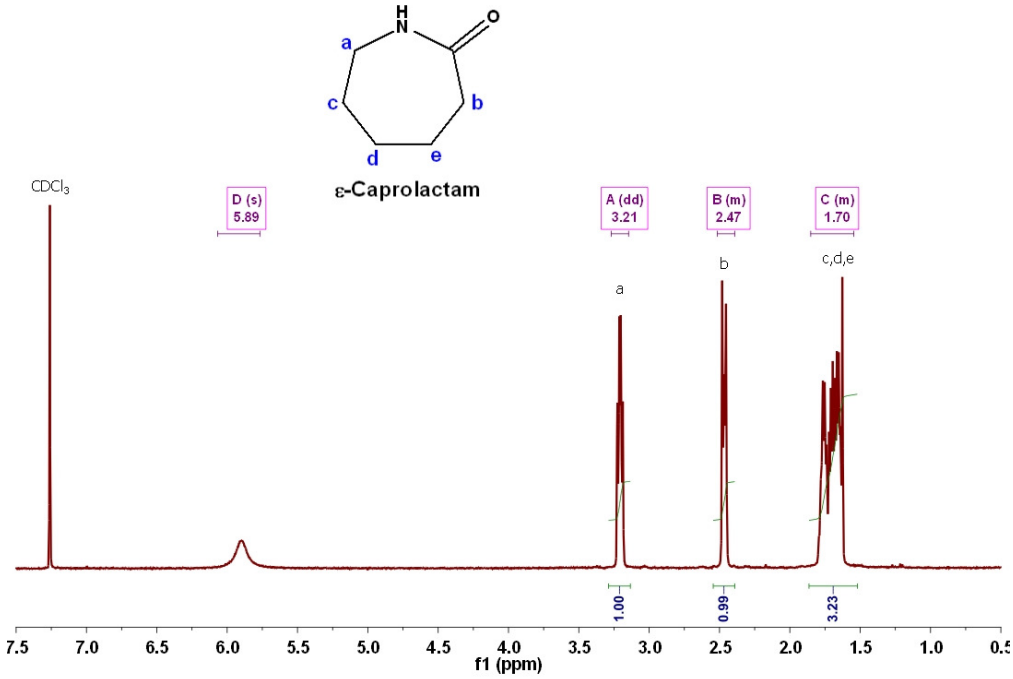

Figure. S3. ^{1}H NMR spectrum of ε-caprolactam

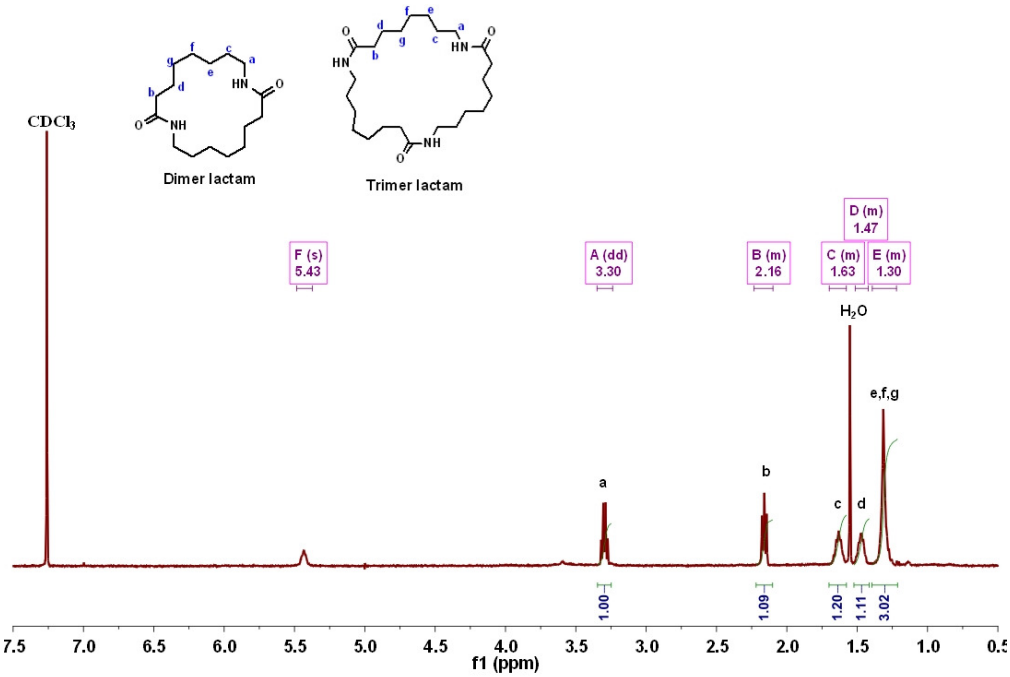

Figure. S4. ^{1}H NMR spectrum of dimer and trimer lactams

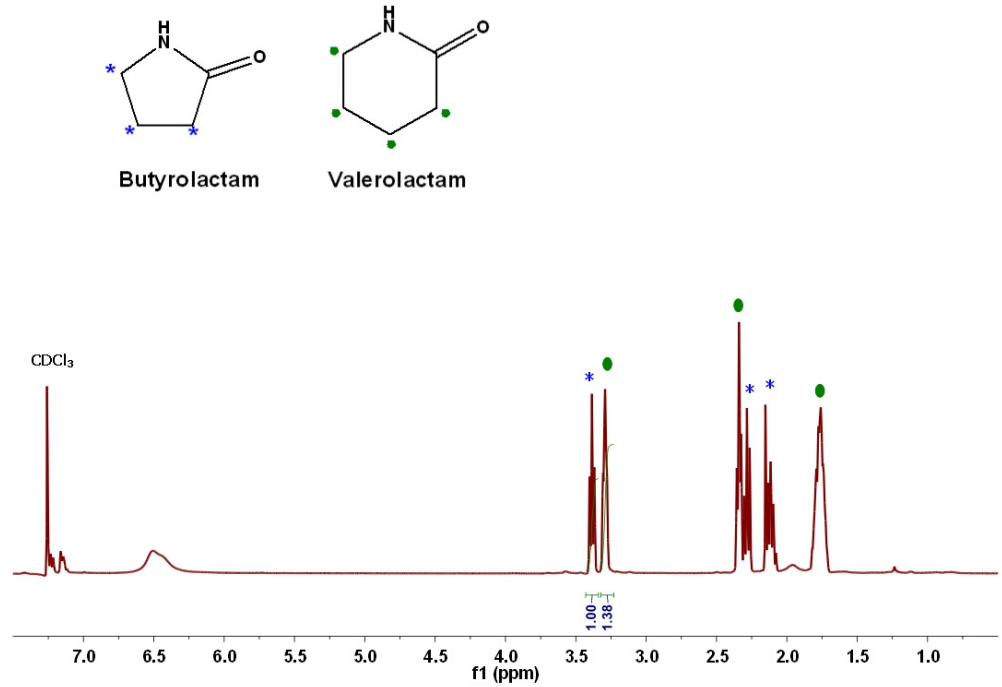

Figure. S5. ^{1}H NMR spectrum from crude product of reaction between 4-aminobutanoic acid with 5-aminovaleric acid

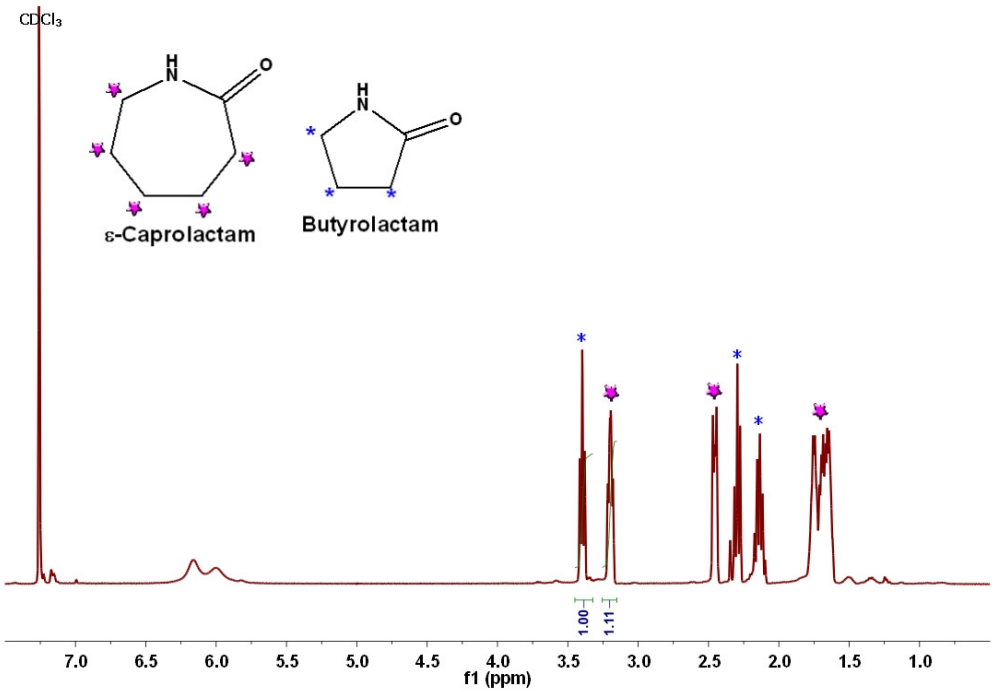

Figure. S6. ^{1}H NMR spectrum from crude product of reaction between 4-aminobutanoic acid with 6-aminocaproic acid

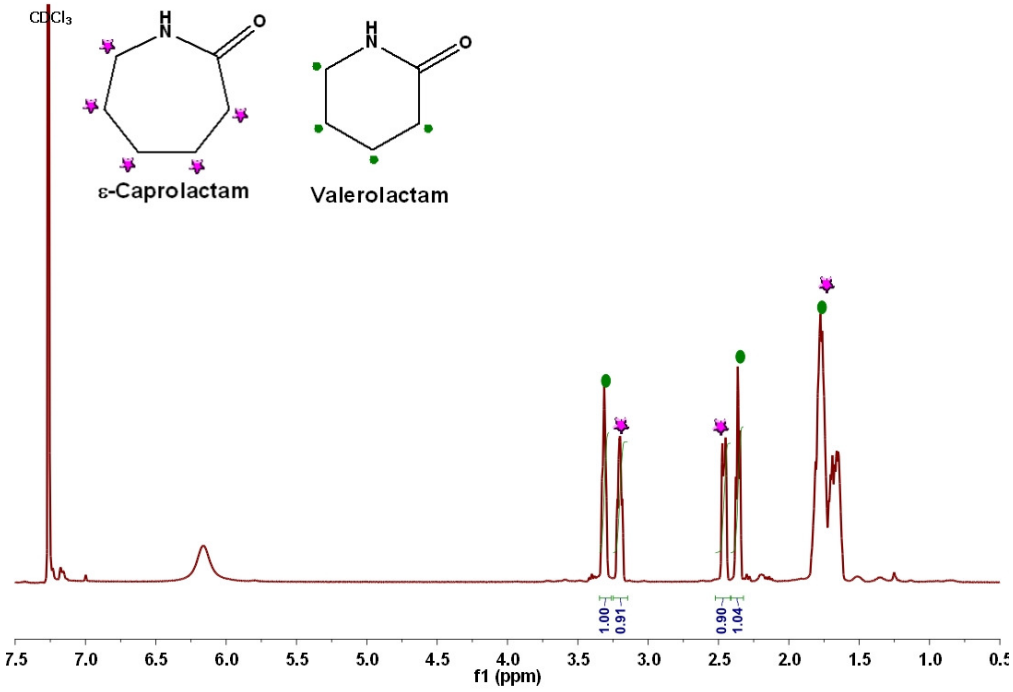

Figure. S7. ^{1}H NMR spectrum from crude product of reaction between 5-aminovaleric acid with 6-aminocaproic acid

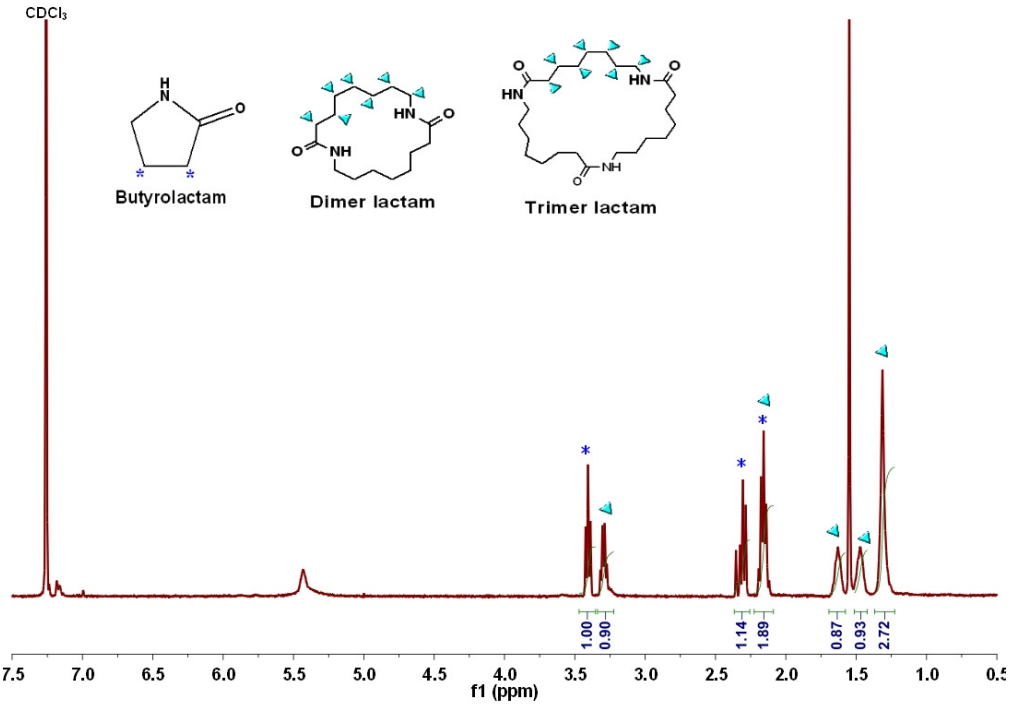

Figure. S8. ^{1}H NMR spectrum from crude product of reaction between 4-aminobutanoic acid with 8-aminooctanoic acid

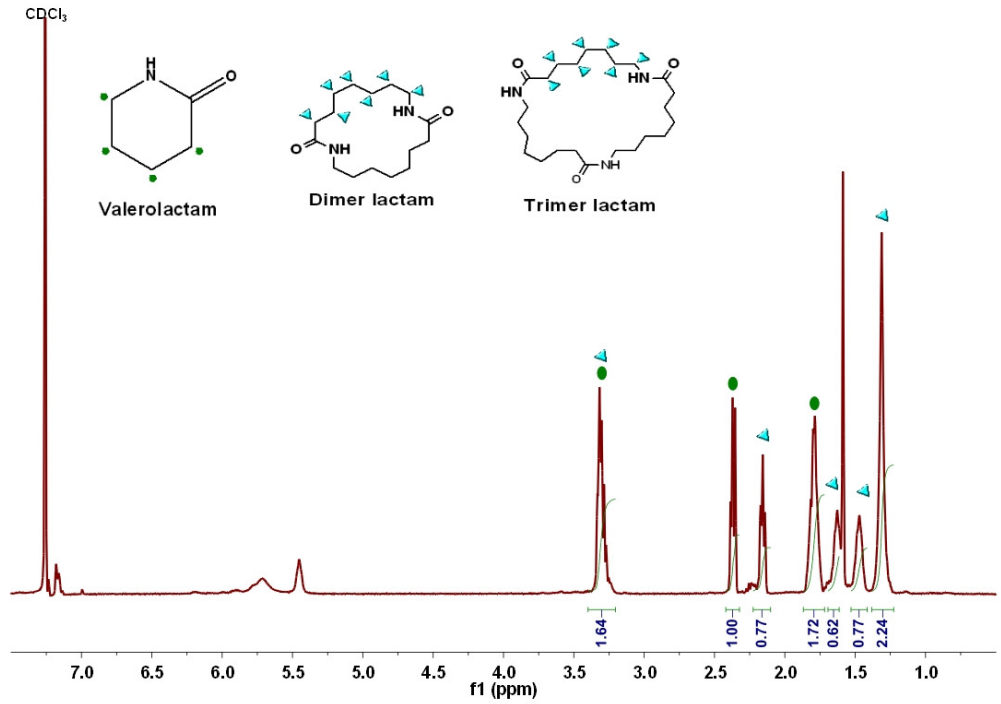

Figure. S1. ^{1}H NMR spectrum from crude product of reaction between 5-aminovaleric acid with 8-aminooctanoic acid

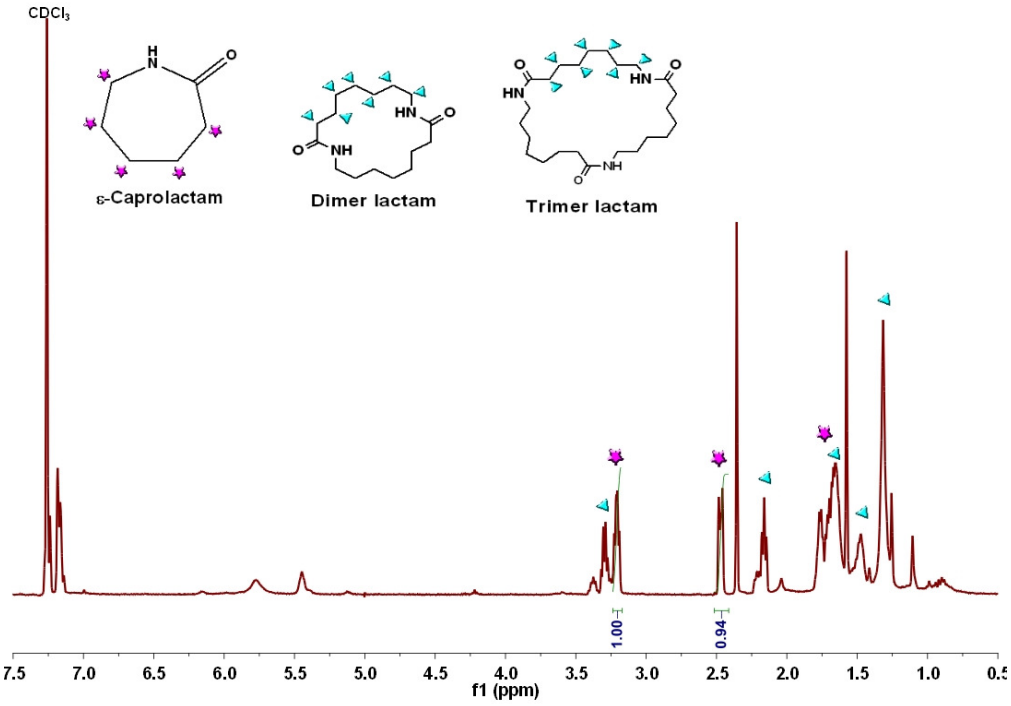

Figure. S10. ^{1}H NMR spectrum from crude product of reaction between 6-aminocaproic acid with 8-aminooctanoic acid

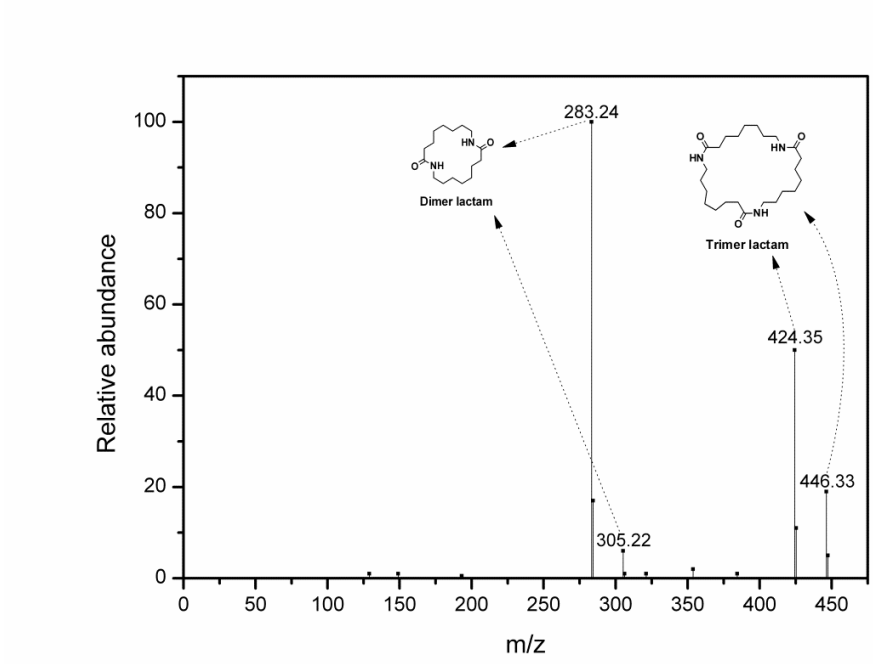

Figure. S11. Mass spectrometry (ESI) chromatogram of dimer and trimer lactams

Transesterification assay: A mixture of deactivated N435 (10 mg) and toluene (20 mL) was stirred at 40 °C, and a solution of 4-nitrophenyl actetate (5 mL, 7.25 mmol L^{-1}) in toluene was added. Immediately methanol (6 µL) was added to the mixture. After 15 minutes, three samples were taken from the mixture and filtered to remove N435 beads. Of each sample, 0.5 mL of the filtrate was dissolved in 9.5 mL toluene, and the resulting solution was used for the UV-absorption measurement. ε pNP (toluene, 304 nm) = 9537 M^{-1} cm^{-1} and ε pNPA (toluene, 304 nm) = 2703 M^{-1} cm^{-1}.

Synthetic activity assay: A mixture of deactivated N435 (100 mg) and toluene was stirred at 90 °C. ε-Caprolactone (1 mL, 9 mmol) was added and stirred for 5h. After 3d, 2 drops of the reaction mixture were withdrawn, and the conversion of ε-caprolactone was analyzed with ^1H NMR spectroscopy.

Table S1. Residual activity of N435 deactivated by heat treatment

N435	Deactivated [h]	Conversion of ε-Caprolactam [%]	Transesterification Activity [nmol PNP min^{-1} mg^{-1}][a]	Synthetic Activity	
				Conversion [%][a]	DPn[a]
1	4	11	59 ± 13	58	8 ± 2
2	24	11	22 ± 0.2	41	3 ± 1

[a]Standard deviation values were calculated from three replicate experiments.