Supplementary Information

New Insights into Synthesis and Oligomerization of ε -Lactams Derived from the Terpenoid Ketone (-)-Menthone

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Figure S1. GPC/SEC elugrams of the entries described in the main text. On bottom, elugrams of the monomers **3a** and **3b** are shown for comparison. The overlay shows the calibration curve with its upper and lower limits (circles). The bimodal peak of entry 3 is currently topic of ongoing investigations.



Figure S2. MALDI-MS spectra of oligomerization experiments, table 1 (main text), entry 2 (HClinduced) and entry 3 (non-ionic; description see text). Spectra show peak distance of monomer unit which is 169.



Figure S3: ¹H-NMR spectrum (CDCl₃) of lactam **3a** obtained *via* the "polyphosphoric acid-route".



Figure S4. ¹H-NMR spectrum (CDCl₃) of lactam **3b** obtained via the "polyphosphoric acid-route".



Figure S5. ¹H-NMR spectrum (CDCl₃) of lactam **3b** obtained via the "HOSA-route".



Figure S6. ¹³C-NMR (CDCl₃) spectrum of lactam 3a



Figure S7¹³C-NMR spectrum (CDCl₃) of lactam **3b** (obtained via "HOSA-route").



Figure S8. ¹H-NMR spectrum (CDCl₃) of menthone after FC.



Figure S9. 1 H-NMR spectrum (CDCl₃) of the byproduct of menthone after FC.



Figure S10. ¹H-NMR spectrum (TFA-d) of **oligo-3a** (see also main text).



Figure S11. ¹H-NMR spectrum (TFA-d) of **oligo-3b** (table 1, entry 4; the different lengths result in a broadening of the signals).



Figure S12. ¹³C-NMR spectrum (TFA-d) of oligo-3a.



Figure S13. ¹³C-NMR spectrum (CDCl₃, after trifluoroacetylation of amide bonds) of oligo-3b.



Figure S14. ¹H-NMR (D₂O) spectrum of amino acid 4 (ring-opened lactam).



Figure S15. ¹³C-NMR (D₂O) spectrum of amino acid 4 (ring-opened lactam).



Figure S16. ¹H-NMR (TFA-d) spectrum of **oligo-3b** obtained by the polycondensation experiment described in main text.



Figure S17. IR spectrum of lactam 3a.



Figure S18. IR spectrum of lactam 3b.



Figure S19. IR spectrum of amino acid 4.



Figure S20. Elugramms and ¹H-NMR spectra of copolymers **oligo-3b-CL** with feed composition ML:CL 1:1 (above) and 1:9 (bottom). Integration of ML- and CL-specific signal leads to the calculated rations described in main text. A little inaccuracy results from partial signal overlap.