Table S15 – Calculated GIAO [B3LYP/6-311++G(d,p)] and experimental chemical shifts (^{1}H and ^{13}C) with respect to TMS used as standard for the structures of L-LA tetramer shown in **Fig. S3**.

	Calculated Δσ / ppm												Exp
Atom[a]	**I-Tetra**	**II-Tetra**	**III-Tetra**	**IV-Tetra**	**V-Tetra**	**VI-Tetra**	**VII-Tetra**	**VIII-Tetra**	**IX-Tetra**	**X-Tetra**	**XI-Tetra**	**Average**[c]	**Δσ / ppm**
$[H_{\alpha}]_A$	4.38	4.27	4.55	4.44	4.58	4.75	4.53	4.53	4.60	4.49	4.53	4.38 (4.40)[d]	4.20
$[H_{\alpha}]_{E1}$	4.97	5.13	5.29	5.61	5.69	5.22	5.11	5.19	5.62	4.84	5.47	5.15 (5.23)	5.10
$[H_{\alpha}]_{E2}$	5.53	5.64	5.03	5.93	5.59	5.03	5.87	5.98	5.63	5.85	6.07	5.55 (5.68)	5.17
$[H_{\alpha}]_C$	4.99	5.73	5.25	5.09	5.16	5.23	5.71	5.05	5.18	4.75	4.40	5.28 (5.38)	4.98
$[H_{Methyl}]_A$ [b]	1.70	1.54	1.43	1.51	1.48	1.53	1.46	1.40	1.40	1.55	1.40	1.58 (1.54)	1.41
$[H_{Methyl}]_{E1}$	1.50	1.49	1.60	1.54	1.59	1.65	1.61	1.50	1.60	1.45	1.59	1.52 (1.49)	1.47
$[H_{Methyl}]_{E2}$	1.47	1.41	1.50	1.50	1.50	1.51	1.52	1.30	1.53	1.38	1.35	1.46 (1.43)	1.28
$[H_{Methyl}]_C$	1.43	1.36	1.44	1.59	1.57	1.39	1.53	1.79	1.61	1.53	1.59	1.43 (1.42)	1.45
H_A	2.96	3.54	2.52	2.59	2.03	0.27	2.05	0.05	0.10	0.06	0.13	3.03 (3.40)	n.o.[e]
H_C	9.06	8.19	9.56	5.74	5.76	9.77	10.05	5.68	5.76	5.79	5.46	8.42 (8.64)	n.o.
$[C_{\alpha}]_A$	73.95	74.20	72.87	72.55	75.29	76.00	76.03	73.30	76.23	73.38	75.85	73.73 (75.11)	65.52
$[C_{\alpha}]_{E1}$	78.43	76.59	77.97	75.75	74.59	77.09	77.10	75.46	74.51	76.96	75.26	77.42 (78.78)	68.61
$[C_{\alpha}]_{E2}$	75.84	75.65	77.38	74.00	74.99	76.73	74.28	73.60	74.64	74.14	73.24	75.78 (76.95)	67.80
$[C_{\alpha}]_C$	79.93	74.13	78.61	76.42	75.86	78.42	78.23	74.89	75.61	78.29	75.66	77.40 (78.85)	69.14
$[C_{Methyl}]_A$	18.37	23.73	21.51	22.26	20.14	25.93	19.23	25.69	25.53	25.00	26.13	21.08 (21.15)	n.o.
$[C_{Methyl}]_{E1}$	19.71	20.15	18.99	20.17	20.09	19.19	19.06	19.52	20.26	19.01	19.32	19.81 (19.90)	n.o.
$[C_{Methyl}]_{E2}$	20.28	19.86	19.45	19.20	19.85	19.74	20.78	17.11	19.73	17.24	17.42	19.89 (20.04)	16. 45
$[C_{Methyl}]_C$	17.95	16.60	20.10	20.00	19.55	20.11	21.07	19.04	19.78	19.25	19.03	18.08 (18.18)	16.56
$[C{=}O]_A$	182.76	187.21	186.78	185.01	180.00	182.42	185.44	178.65	179.84	180.35	180.59	185.09 (186.78)	171.18
$[C{=}O]_{E1}$	176.26	177.17	176.81	177.06	177.45	177.10	176.14	176.82	177.69	176.62	176.22	176.78 (178.58)	169.31
$[C{=}O]_{E2}$	176.34	175.30	175.69	177.90	177.69	176.10	177.65	176.58	178.13	176.60	177.49	176.15 (178.04)	169.69
$[C{=}O]_C$	176.03	179.70	174.28	177.94	177.86	174.41	173.95	177.98	178.28	175.43	174.36	177.27 (179.32)	169.25
$[O]_A$	221.87	223.14	220.51	215.83	218.40	230.98	225.31	220.19	223.12	225.75	224.74	221.38	n.i.[f]
$[O]_{E1}$	223.47	224.32	226.82	222.26	223.75	226.36	218.61	225.73	224.05	219.65	227.81	224.12	n.i.
$[O]_{E2}$	226.29	225.73	222.85	229.94	228.01	223.34	230.20	229.30	228.32	244.53	231.90	226.13	n.i.
O_C	211.37	214.66	202.88	202.85	204.50	204.26	208.90	196.49	205.00	201.10	197.07	210.18	n.i.
$[O_{Carbonyl}]_A$	404.15	392.29	380.76	391.84	399.90	387.11	410.33	416.08	405.42	411.09	399.44	395.48	n.i.
$[O_{Carbonyl}]_{E1}$	408.76	404.98	408.82	396.51	403.90	406.80	395.99	391.91	399.10	402.90	389.53	406.04	n.i.
$[O_{Carbonyl}]_{E2}$	412.67	415.84	407.84	404.09	402.38	405.97	414.13	414.08	400.26	408.03	419.29	411.98	n.i.
$[O_{Carbonyl}]_C$	428.90	397.73	416.44	405.22	403.11	414.76	414.57	408.26	402.07	416.35	421.46	413.91	n.i.
O_A	54.61	54.43	42.44	43.35	44.81	58.39	63.94	59.47	60.59	57.82	59.92	51.40	n.i.

[a] See **Fig. S3** for atom and monomeric units labeling. [b] Average over the three hydrogen atoms of the methyl group ($-CH_3$). [c] Weighted average taking into account the Boltzmann's population of the conformers at room-temperature (**I-Tetra** – 40.00%; **II-Tetra** – 32.74%; **III-Tetra** – 14.11%; **IV-Tetra** – 12.51%; **V-Tetra** – 0.47%; **VI-Tetra** – 0.09%; **VII-Tetra** – 0.05%; **VIII-Tetra** – 0.04%; **IX-Tetra** – 0.01%; **X-Tetra** – 0.00%; **XI-Tetra** – 0.00%). [d] Results in parentheses arise from the calculations performed with aug-cc-pVTZ-J basis set (all the conformers and the respective populations were taking into account). [e] n.o. – not observed. [f] n.i. – not investigated.