Electronic Supplementary Information

Non-covalent Modification of Reduced Graphene Oxide by Chiral Liquid Crystalline Surfactant

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Synthesis of CLCS

Monomer1 (M_1) cholesteryl 4-(allyloxy)benzoate was synthesized according to reference[1], it showed the following phase transition: Crystalline (112°C), chiral nematic (240°C), and isotropic fluid, the detailed chemical parameters of M_1 were as follows, IR (KBr): 3056(=CH), 2973-2857(CH_3, CH_2), 1704(C=O), 1643 (C=C), 1605(Ar), 1494(Ar), 1273(C-O-C), 1171(C-O-C), ^{1}HNMR (600 MHz, $CDCl_3$, δ): 7.99-7.98(d, 2H, Ar-**H**), 6.92(d, 2H, Ar-**H**), 6.05(m, 1H, CH_2=C**H**-), 5.44-5.41(t, 2H, C**H**$_2$=CH-), 5.32-5.31(m, 1H, =C**H**- in cholesteryl), 4.59-4.58(d, 2H, -OC**H**$_2$-), 2.03-0.67(m, 44H, cholesteryl-**H**). Monomer2 (M_2) 10-(4'-(4-(allyloxy)benzoyloxy)biphenyl-4-yl oxy)-10-oxodecanoic acid was synthesized according to reference[2], it showed the following phase transition: Crystalline (135.2°C), nematic (199.6°C), and isotropic fluid, the detailed chemical parameters of M_2 were as follows, IR (KBr): 3029, 2930, 2853(-CH2-), 2690-2510(-OH in -COOH),1760-1700 (C=O in ester and carboxylic acid modes), 1605, 1504, 1269(C-O-C), ^{1}HNMR (600 MHz, $CDCl_3$, δ): 1.23-1.35(m, 10H, (C**H**$_2$)$_5$), 1.69(m, 2H, -C**H**$_2$CH$_2$COOH), 2.11(m, 2H, -COC**H**$_2$), 3.06(m, 2H, -CH$_2$C**H**$_2$COOH), 5.01(d, 2H, -OC**H**$_2$-), 5.70-5.82 (t, 2H, C**H**$_2$=CH-), 6.11(m, 1H, CH_2=C**H**-), 6.81-7.17(m, 4H, -Ar), 7.47-7.64(m, 8H, -2Ar). Nonmesogens monomer 3 (M_3) N-(1, 1-bis(1-ethyl-2-methyl-1H-indol-3-yl)-3-oxo-1,3-dihydroisobenzofuran-5-yl)undec-10-enamide was synthesized according to references,[3,4] it showed the following phase sequence: Crystalline (68.6 °C), and isotropic fluid, the detailed chemical parameters of M_3 were as follows, IR (KBr): 3317 (NH), 3048 (=CH), 2974-2853 (CH_3, CH_2), 1761, 1735 (C=O), 1610 (Ar), 1493 (Ar), 1H NMR (600 MHz, $CDCl_3$, δ): 1.281 (m, 10H,(C**H**$_2$)$_5$), 1.301 (t, 6H, 2NCH$_2$C**H**$_3$), 1.718 (m, 2H, -COCH$_2$C**H**$_2$), 2.036 (s, 6H, 2NCC**H**$_3$), 2.264 (m, 2H, =CHC**H**$_2$), 2.413 (t, 2H,-COC**H**$_2$), 4.189 (q, 4H, 2NC**H**$_2$), 4.925 (d, 2H, =C**H**$_2$), 5.778 (m, 1, =C**H**), 6.735 (d, 2H, 2Ar-), 6.816 (d, 2H, 2Ar-),

7.095 (q, 2H, 2Ar-), 7.304 (q, 2H, 2Ar-), 7.320 (d, 1H, Ar-), 7.551 (d, 1H, Ar-), 8.065 (s, 1H, N**H**-), 8.346 (s, 1H, Ar-). CLCS was synthesized according to reference[5]. M_1, M_2 and M_3 were added to polymethylhydrogensilxoane (PMHS, Aldrich). After the addition of platinum catalyst, the polymerization was carried out at 80 °C under nitrogen protection with magnetic stirring until the infrared spectra showed no Si-H absorption peak at 2166cm^{-1}.[6]

Optical textures of CNLCs

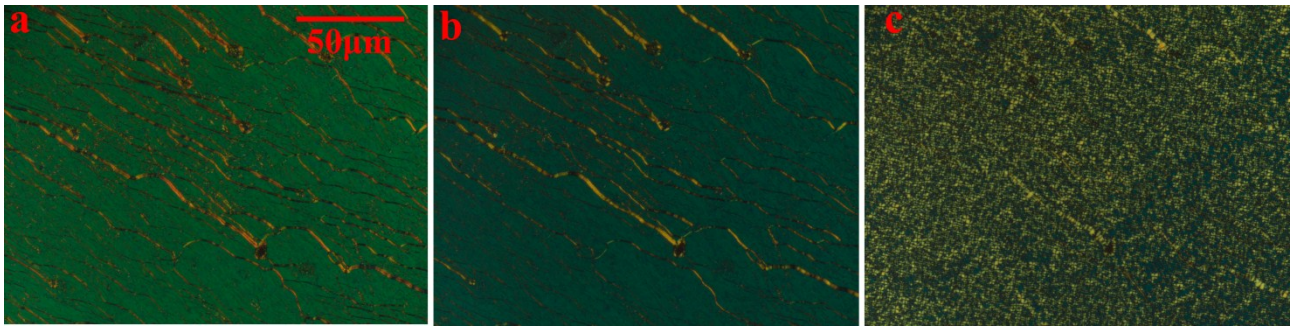

Fig. S1 Optical textures of CNLCs, a (20 °C), b(40 °C) and c (60 °C), crossed polarizers, 200×.

RGB values, tristimulus values, and chromaticity coordinates of CLCS, CLCS+0.3wt%RGO, CLCS+0.6wt%RGO and CLCS+0.9wt%RGO at different temperatures

Table S1. RGB values, tristimulus values, and chromaticity coordinates of CLCS at different temperatures.

Temperature	R	G	B	X	Y	Z	x	y
148 °C	243	126	59	960.24	824.97	337.18	0.452	0.389
165 °C	255	198	82	1145.58	1168.89	469.92	0.411	0.42
167 °C	115	201	4	675.04	1037.97	33.73	0.386	0.594
170 °C	0	76	102	248.41	355.02	574.91	0.211	0.301
174 °C	50	46	63	290.23	264.96	355.04	0.319	0.291

Table S2. RGB values, tristimulus values, and chromaticity coordinates of CLCS+0.3wt%RGO at different temperatures.

Temperature	R	G	B	X	Y	Z	x	y
148 °C	243	124	58	955.61	815.73	331.48	0.454	0.388
161 °C	255	199	52	1113.43	1171.68	302.15	0.43	0.453
164 °C	105	190	0	623.56	977.23	10.74	0.387	0.606
166 °C	0	65	113	241.57	305.19	635.83	0.204	0.258
172 °C	58	49	76	332.32	287.51	427.94	0.317	0.274

Table S3. RGB values, tristimulus values, and chromaticity coordinates of CLCS+0.6wt%RGO at different temperatures.

Temperature	R	G	B	X	Y	Z	x	y
148 °C	255	135	70	1021.66	878.95	399.23	0.444	0.382
158 °C	255	221	0	1093.20	1269.55	12.49	0.46	0.534
160 °C	0	119	3	211.84	546.47	23.51	0.271	0.699
162 °C	0	63	142	270.85	297.75	797.95	0.198	0.218
167 °C	78	71	125	481.62	411.45	703.3	0.302	0.258

Table S4. RGB values, tristimulus values, and chromaticity coordinates of CLCS+0.9wt%RGO at different temperatures.

Temperature	R	G	B	X	Y	Z	x	y
148 °C	249	135	47	979.06	871.57	270.56	0.461	0.411
154 °C	255	242	1	1131.11	1366.01	19.27	0.449	0.543
155 °C	0	129	0	225.97	592.2	7.29	0.274	0.718
157 °C	0	55	109	219.54	259.04	612.89	0.201	0.237
161 °C	42	42	89	290.45	240.16	500.27	0.282	0.233

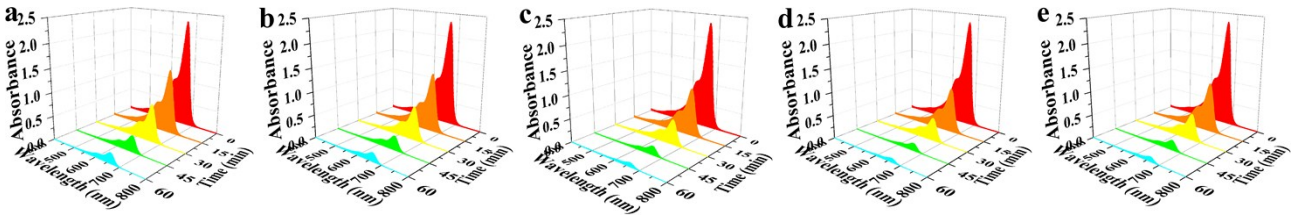

Fig. S2 UV-Vis absorption spectra of MB solutions at different time intervals for different amounts of RGO at the fixed amount of ZnO/CLCS, (a) 0.02 g ZnO+2 mg CLCS, (b) 0.02 g ZnO+2 mg CLCS+0.1 mg RGO, (c) 0.02 g ZnO+2 mg CLCS+0.2 mg RGO, (d) 0.02 g ZnO+2 mg CLCS+0.4 mg RGO and (e) 0.02 g ZnO+2 mg CLCS+0.6 mg RGO.

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