Supporting Information

Chiral carbon dots based on L/D-cysteine produced via room temperature surface modification and one-pot carbonization

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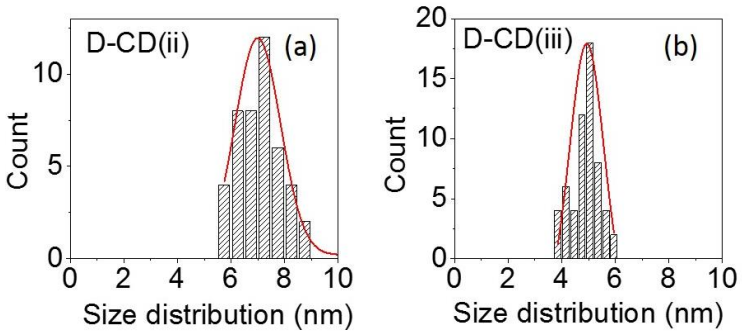

Figure S1. Size distribution histograms of (a) D-CD(ii) and D-CD(iii), obtained from TEM measurements.

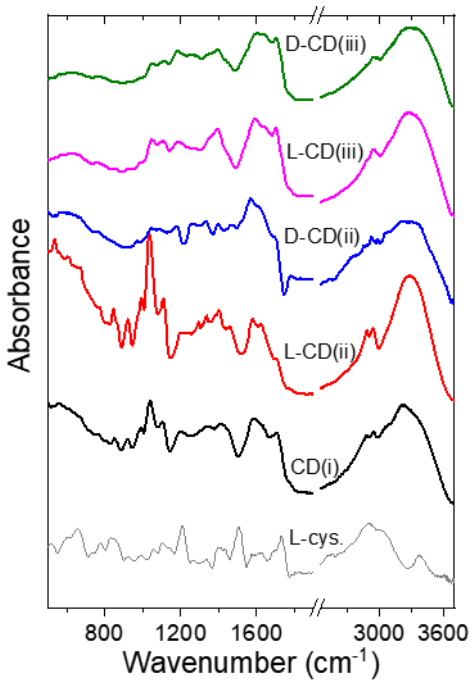

Figure S2. FTIR spectra of five CD samples and L-cysteine.

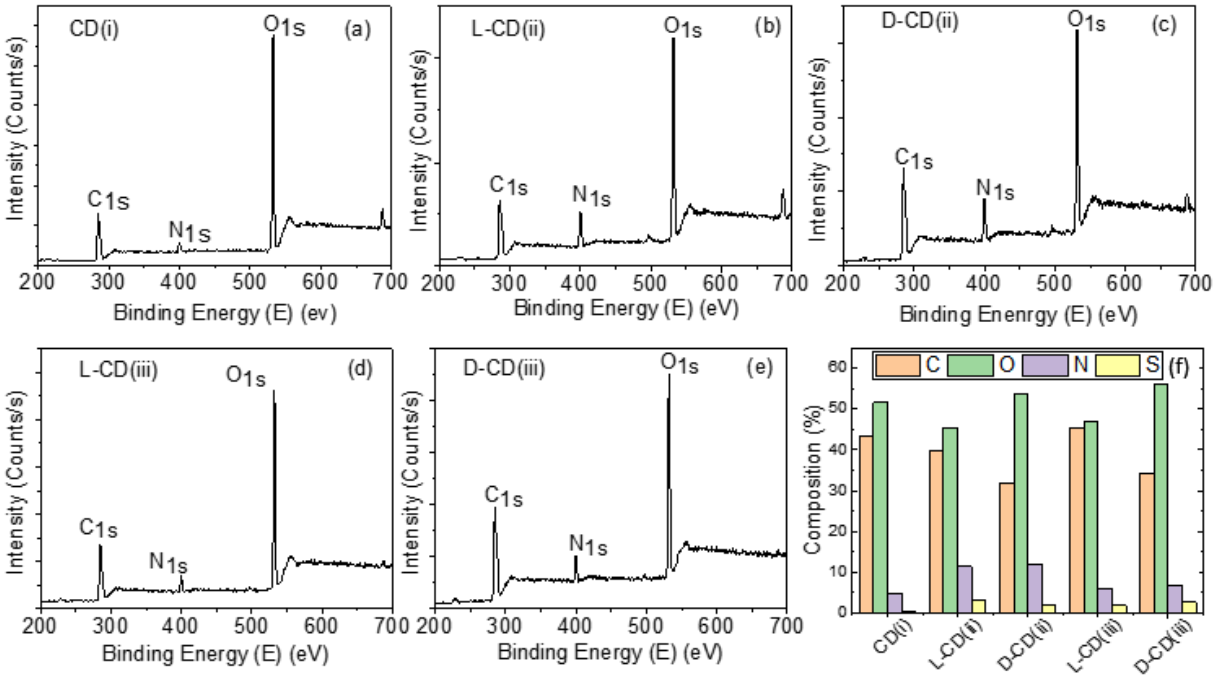

Figure S3. XPS survey of CD samples: (a) CD(i), (b) L-CD(ii), (c) D-CD(ii), (d) L-CD(iii), (e) D-CD(iii). (f) Chemical composition of five CD samples derived from the XPS spectra; the names of the samples are given on the x-axis.

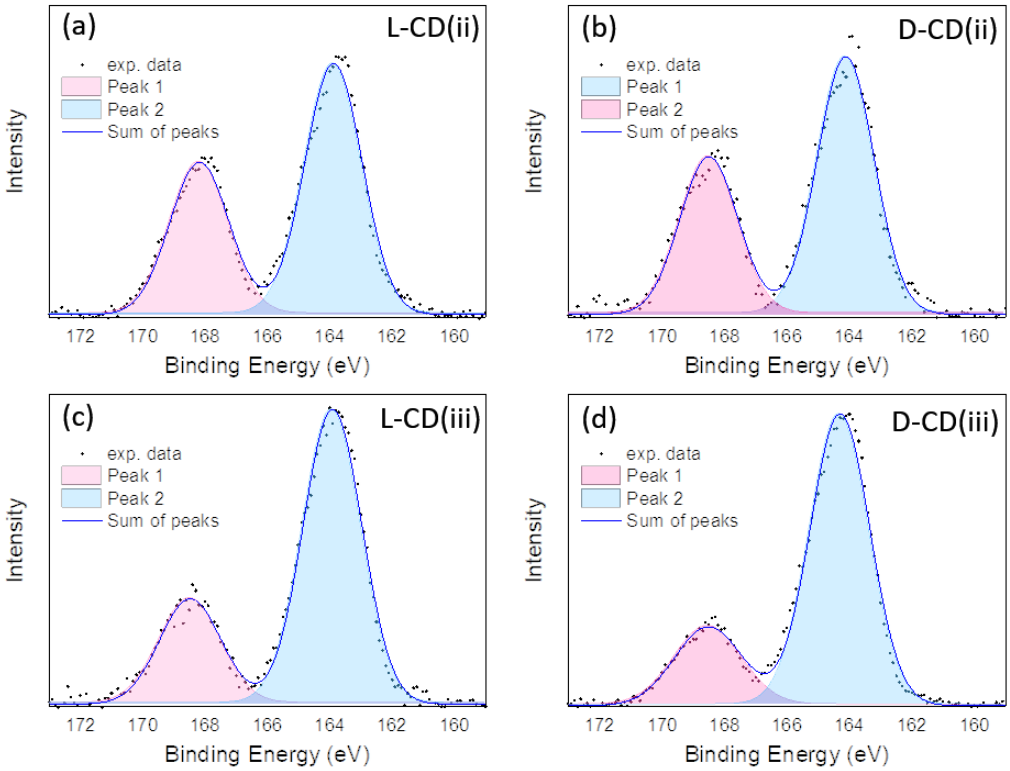

Figure S4. High-resolution XPS spectra of S2p of the CD samples: (a) L-CD(ii); (b) D-CD(ii); (c) L-CD(iii); (d) D-CD(iii). Peak 1 and peak 2 are attributed to the S-O and S-H/S-C bonding, respectively.

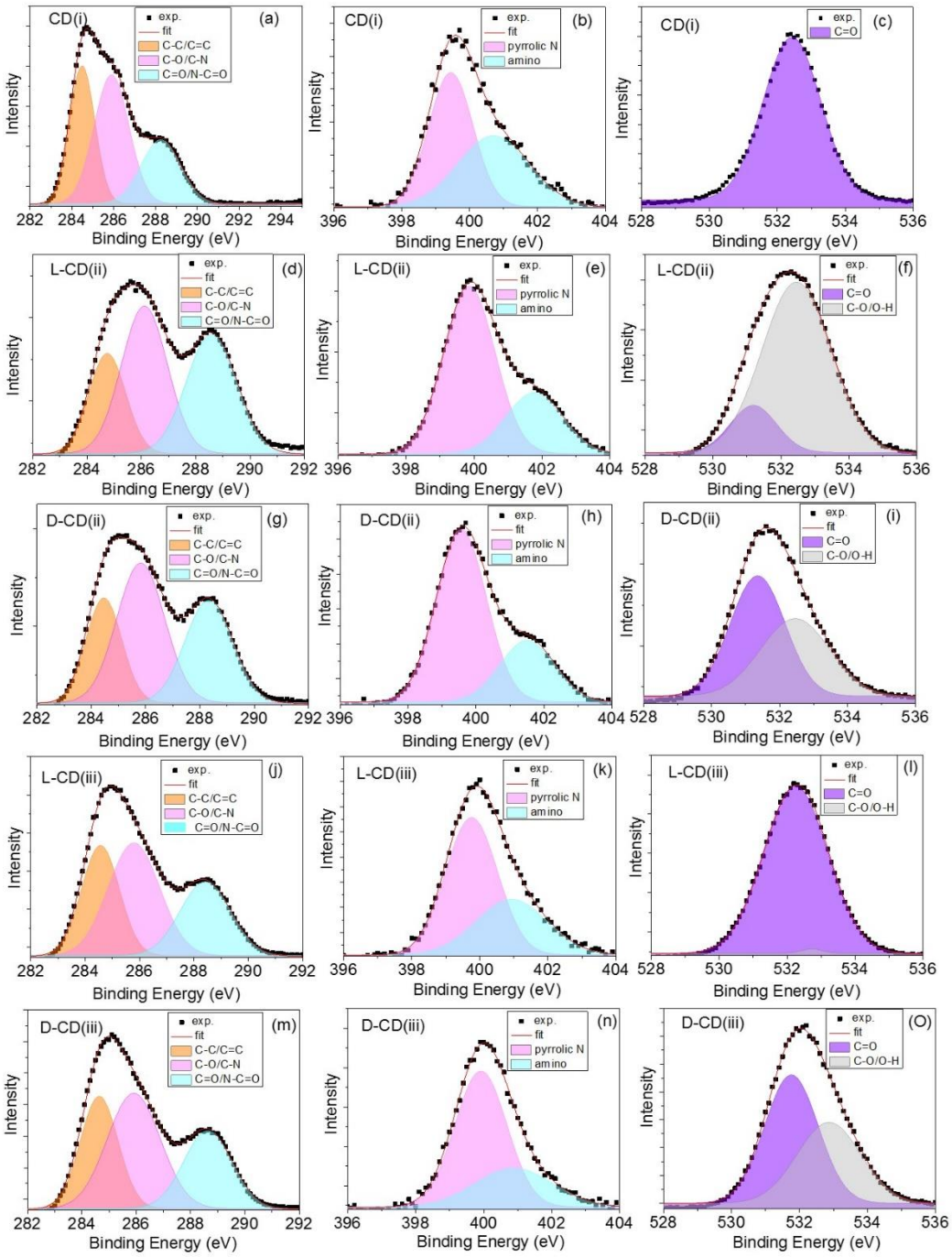

Figure S5. High-resolution XPS spectra of C1s (a, d, g, j, m); N1s (b, e, h, k, n); O1s (c, f, i, l, o) of the CD samples: CD(i) (a-c); L-CD(ii) (d-f); D-CD(ii) (g-i); L-CD(iii) (j-l); D-CD(iii) (m-o). Experimental data (exp.) are shown by black dots, and the overall fitting curves (fit) – by red lines. Differently coloured individual deconvoluted peaks are assigned to different bonds as explained in the legend.

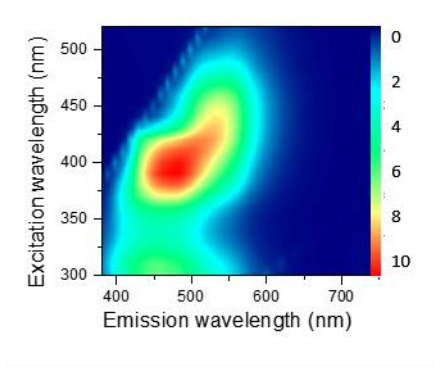

Figure S6. PLE-PL map of CD(i).

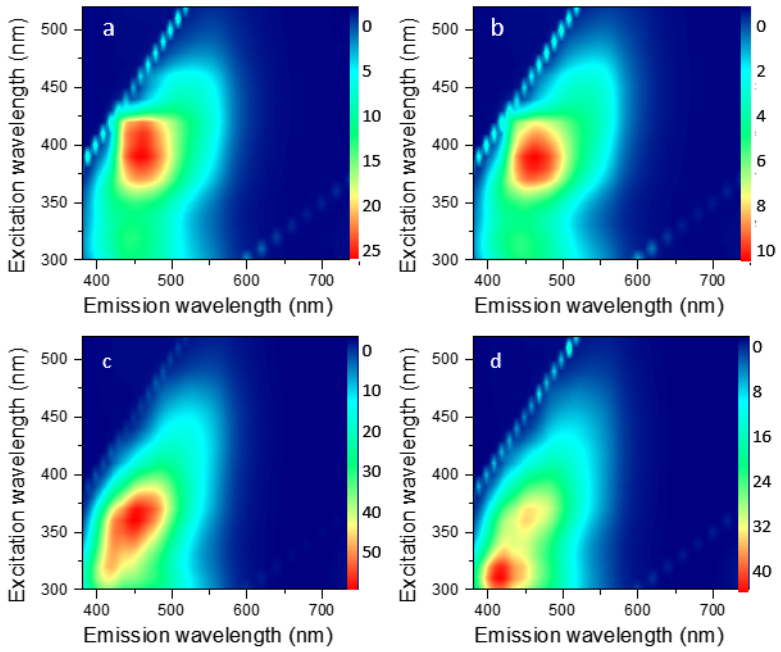

Figure S7. PLE-PL maps of (a) L-CD(ii), (b) D-CD(ii), (c) L-CD(iii), and (d) D-CD(iii).

Table S1. Optical parameters of CDs

Sample name	Absorption peak, nm	PL peak, nm ex@350 nm	PL peak, nm ex@405 nm	PL peak, nm ex@450 nm	PL lifetime, ns ex@405nm	PL QY, % ex@350nm
CD(i)	334	452	474	540	4.1 ± 0.3	2.5%
L-CD(ii)	334	450	460	520	5.2 ± 0.3	8.3%
D-CD(ii)	339	450	462	530	5.0 ± 0.3	8.5%
L-CD(iii)	338	450	480	518	6.2 ± 0.3	21.8%
D-CD(iii)	328	450	480	510	5.0 ± 0.3	18.2%

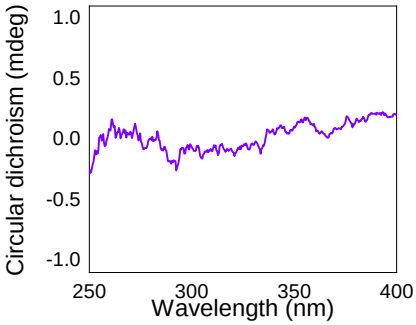

Figure S8. Circular dichroism spectrum of CD(i).

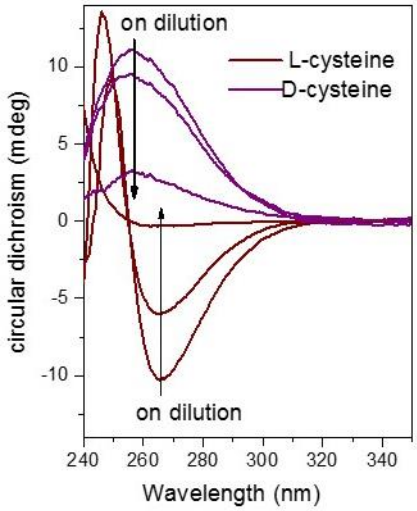

Figure S9. Circular dichroism spectra of L/D-cysteine at different concentrations starting from 5 mM to 0.25 mM (dilution direction is shown be two arrows).

Table S2. Calculation of dissymmetry factor

Sample	Wavelength (nm)	CD (mdeg)	Optical density for 1 cm cuvette	G factor* $\times 10^{-5}$
L-CD(ii)	350	-3.2	2	-4.8
	268	-10.3	1.14	-27
	210	19.4	1.4	42
D-CD(ii)	350	4.72	2.5	5.7
	268	10	1.27	24
	210	-19	1.2	-48
L-CD(iii)	328	-4.47	3.2	-4.2
	219	-2.19	1.26	-5.3
	209	4	1.6	7.6
D-CD(iii)	328	4	3	4.04
	217	1.9	1.4	4.1
	205	-3.5	1.9	-5.6

*G factor has been calculated using the following equation: G = CD (in mdeg) / (A*32980), where A is the absorbance of unpolarised light.

Table S3. Estimation of two photon absorption cross-section for L-CDs samples

	Concentration (μM)	OD @400nm	ε @400nm $\times 10^5$	PLYQ,% (to QS)	TPL, a.u.	σ, GM
L-CD(ii)	4.38	0.170	0.78	2	803	13.0
L-CD(iii)	8.76	0.194	0.44	2	1143	9.2
R6G	15.8	N/A	N/A	90	338664	33

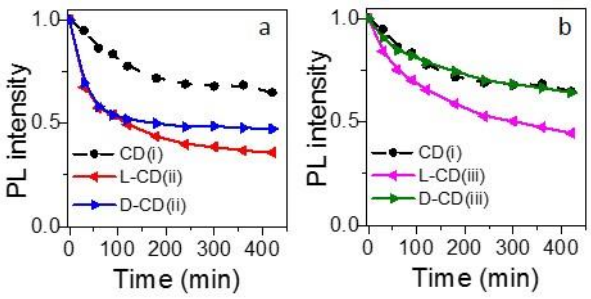

Figure S10. Change of the integrated PL intensity of (a) L/D-CD(ii) and (b) L/D-CD(iii) during UV exposure, compared with reference sample of CD(i) for both cases.