Electronic Supplementary Information for

Surface state modulation of blue-emitting carbon dots with high quantum yield and high product yield

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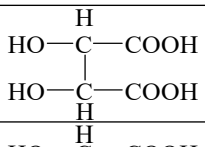
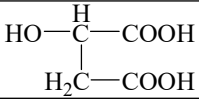
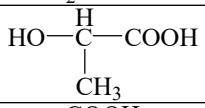
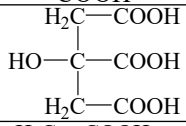
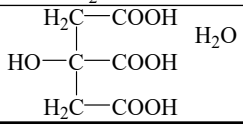
Supplementary Figures and Tables

Table S1 Comparison of QY and PY values of CDs synthesized with different carbon sources (silane coupling agent is KH-792)

CDs	Molecular structure of carbon source	n	QY/%	PY/%
TA-CDs		–COOH: 2 –OH: 2	2.89	54.74
MA-CDs		–COOH: 2 –OH: 1	3.06	57.21
LA-CDs		–COOH: 1 –OH: 1	3.31	58.76
OA-CDs		–COOH: 2 –OH: 0	3.44	56.73
a-CDs		–COOH: 3 –OH: 1	60.52	54.19
CA-CDs		–COOH: 3 –OH: 1 H_2O: 1	97.32	52.56

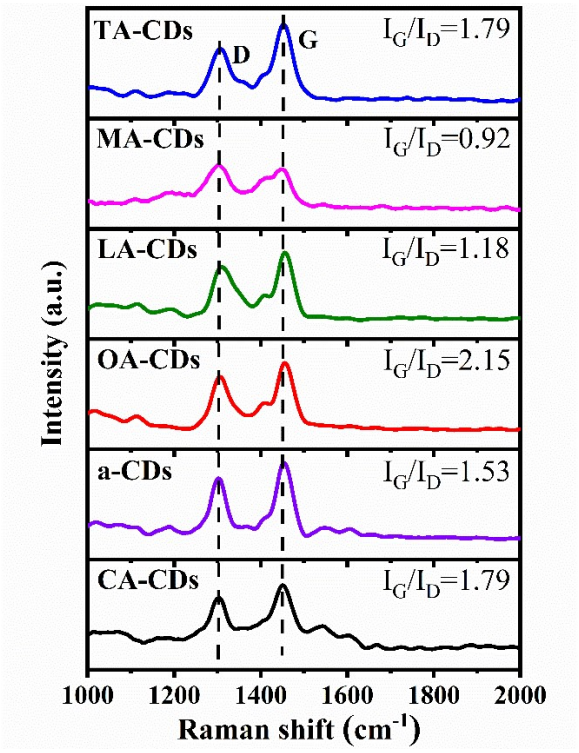


Fig. S1 Raman spectrum of CDs synthesized with different carbon sources (silane coupling agent

is KH-792)

Table S2 Elemental analysis of CDs synthesized with different carbon sources (silane coupling agent is KH-792)

CDs	C/%	H/%	N/%	O/%	Si/%
TA-CDs	37.30	8.92	16.05	6.76	30.79
MA-CDs	37.60	8.82	15.96	6.27	31.36
LA-CDs	37.75	8.56	16.01	5.72	31.96
OA-CDs	37.49	9.10	16.21	6.80	30.40
a-CDs	38.94	8.57	16.43	6.95	29.11
CA-CDs	36.25	7.98	15.29	14.71	25.77

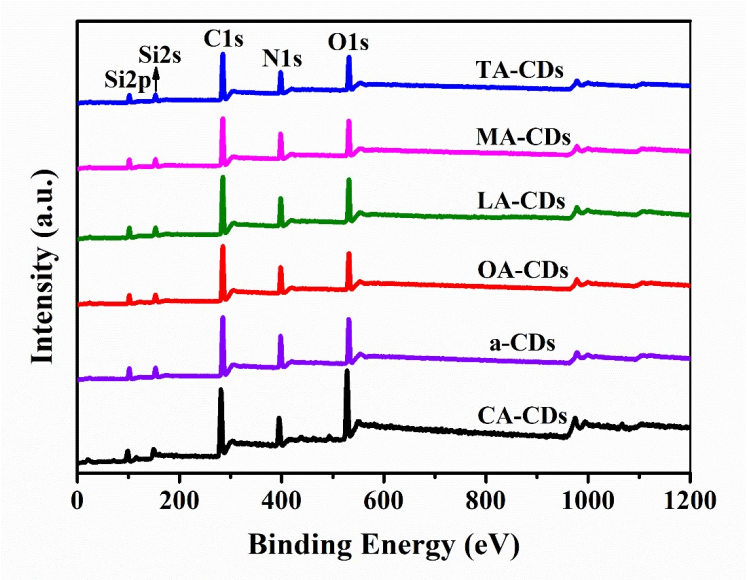


Fig. S2 XPS spectrum of CDs synthesized with different carbon sources (silane coupling agent is KH-792)

Table S3 Element content analysis of XPS for CDs synthesized with different carbon sources (silane coupling agent is KH-792)

CDs	C/%	N/%	O/%	Si/%
TA-CDs	60.06	14.44	14.87	10.62
MA-CDs	58.63	15.74	14.00	11.63
LA-CDs	57.89	14.94	15.17	12.00
OA-CDs	60.65	15.47	13.35	10.53
a-CDs	57.82	16.15	14.56	11.46
CA-CDs	56.40	13.22	19.83	10.55

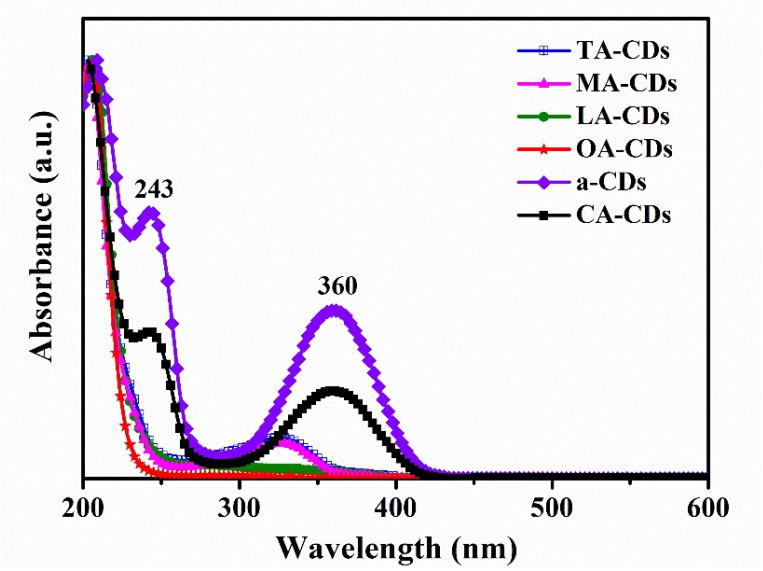


Fig. S3 UV-vis absorption spectroscopy of CDs synthesized with different carbon sources (silane coupling agent is KH-792)

Table S4 Fitting parameters of fluorescence decay curve of CDs synthesized with different carbon sources (silane coupling agent is KH-792)

CDs	α_1	τ_1 (ns)	α_2	τ_2 (ns)	χ^2	$\langle\tau\rangle$ (ns)
TA-CDs	0.30	1.79	0.70	11.07	1.30	10.47
MA-CDs	0.34	4.03	0.66	10.53	1.05	9.46
LA-CDs	0.30	1.82	0.70	12.21	1.30	11.59
OA-CDs	0.24	3.95	0.76	13.78	1.08	12.96
a-CDs	1.00	18.00	–	–	1.30	18.00
CA-CDs	0.10	9.07	0.90	14.99	1.04	14.62

Table S5 Comparison of PY and QY values of CDs synthesized with different silane coupling agents (carbon source is CA)

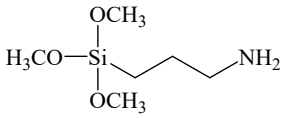
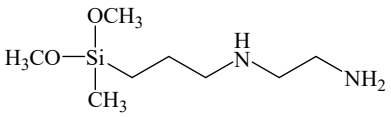
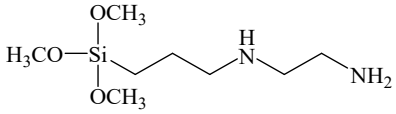
CDs	Molecular structure of silane couling agents	n	QY/%	PY/%
540-CDs		$-OCH_3$: 3 $-NH_2$: 1	29.57	46.33
602-CDs		$-OCH_3$: 2 $-NH_2$: 2	84.53	58.53
CA-CDs		$-OCH_3$: 3 $-NH_2$: 2	97.32	52.56

Table S6 Elemental analysis of CDs synthesized with different silane coupling agents (carbon source is CA)

CDs	C/%	H/%	N/%	O/%	Si/%
540-CDs	30.09	7.13	10.75	6.54	45.49
602-CDs	38.60	8.51	16.42	6.66	29.81
CA-CDs	36.25	7.98	15.29	14.71	25.77

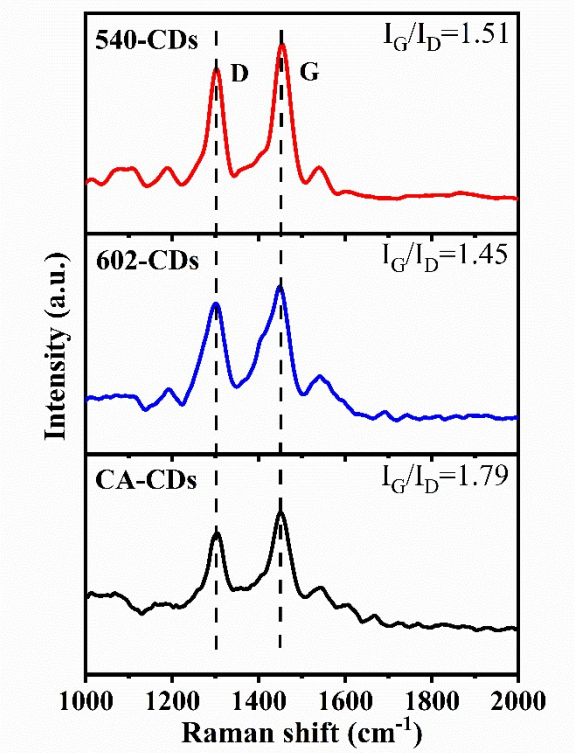


Fig. S4 Raman spectrum of CDs synthesized with different silane coupling agents (carbon source is CA)

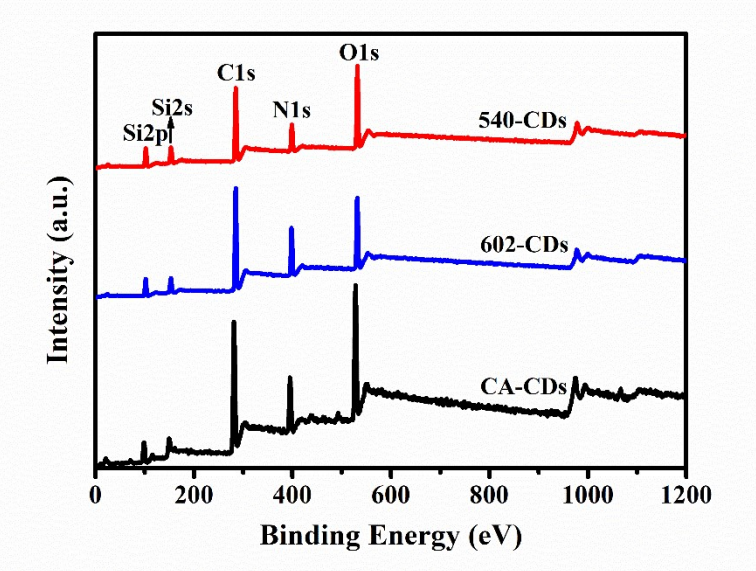


Fig. S5 XPS spectrum of CDs synthesized with different silane coupling agents (carbon source is CA)

Table S7 Elemental content analysis of XPS for CDs synthesized with different silane coupling agents (carbon source is CA)

CDs	C/%	N/%	O/%	Si/%
540-CDs	54.46	10.73	19.66	15.15
602-CDs	59.94	15.04	14.01	11.00
CA-CDs	56.40	13.22	19.83	10.55

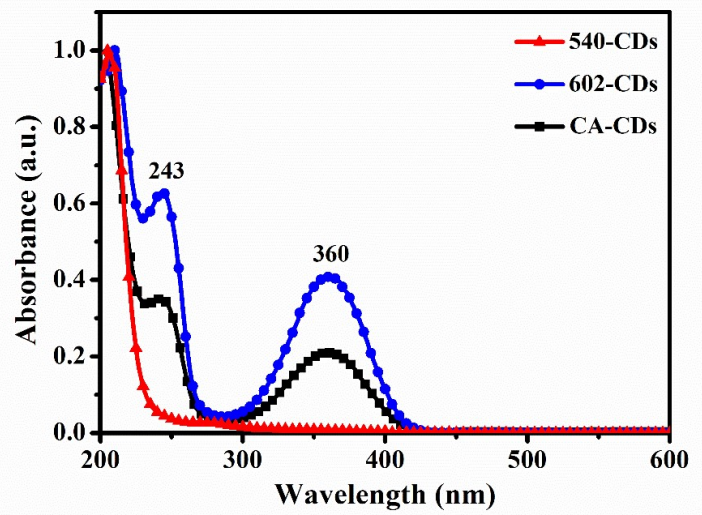


Fig. S6 UV-vis absorption spectroscopy of CDs synthesized with different silane coupling agents (carbon source is CA)

Table S8 Fitting parameters of fluorescence decay curve of CDs synthesized with different silane coupling agents (carbon source is CA)

CDs	α_1	τ_1 (ns)	α_2	τ_2 (ns)	χ^2	$\langle\tau\rangle$ (ns)
540-CDs	1.00	12.97	–	–	1.26	12.97
602-CDs	1.00	17.89	–	–	1.01	17.89
CA-CDs	0.10	9.07	0.90	14.99	1.04	14.62