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SUPPLEMENTARY INFORMATION

Design and Fabrication of Carbon Dots for Energy Conversion and Storage

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Table S1. Comparison of different CDs synthesized via top-down methods

Precursor	Synthesis method	QY/%	Ref.
SWCNTs	Acidic & hydrothermal treatment	/	1
SWCNTs	Oxidative acid treatment, (separated by preparative electrophoresis)	1.6	2
MWCNTs	Electrochemical oxidation (acetonitrile solution with tetrabutylammonium perchlorate)	6.4	3
Graphite	Laser ablation PEG_{1500N}, PPEI-EI	4-10	4
graphite	Acidic oxidation& Microwave hydrothermal treatment	3.62	5
Graphite rod	Electrochemical oxidation	12	6
Graphite rod	Electrochemical oxidation	/	7
Graphite rod	Electrochemical oxidation (N_2H_4 reduction)	/	8
Graphite oxide	Oxidative acid treatment, followed by partially reduction pathway	2.1-24	9
Graphite oxide	Microwave–hydrothermal method	2.72	10
Graphite oxide	Hydrothermal method in ammonia	29	11
Graphite oxide	microwave irradiation $NaBH_4$ reduction	11.7-22.9	12
3D graphene	Electrochemical oxidation in ionic liquid	10	13
Graphene sheets	Hydrothermal method in ammonia	7.5	14
Candle soot	Oxidative acid treatment, (separated by electrophoresis)	0.8-1.9	15
Natural gas soot	Oxidation with nitric acid	0.43	16
Carbon fibers	Electrochemical oxidation	1.12-1.47	17
Pitch-based carbon fibers	acid treatment and chemical exfoliation	/	18
Carbon black	Acidic oxidation	2.29	19
Coal	Acidic oxidation	/	20
Coal	Acidic oxidation $NaBH_4$ reduction	8.6-9	21
PAHs	Acidic oxidation & Hydrothermal treatment	2.5	22

Table S2. Comparison of different CDs synthesized via bottom-up methods

Precursor	Synthesis method	QY/%	Ref.
Ethanol	Electrochemical oxidation	4	23
Glycerol	Microwave-assisted pyrolysis	12	24
PVA+EDA	Hydrothermal synthesis	35%	25
PEG-400	Hydrothermal treatment	5.32%	26
2-amino-2-hydroxymethyl-propane-1,3-diol (TRIS)	Hydrothermal treatment	26	27
Phenol/formaldehyde resin	high-temperature treatment	14.7	28
NMP+MgAPO-44	carbonization	10.0%	29
Citric acid	(HDA) Thermal decomposition and pyrolysis	53	30
Citric acid	(BPEI) carbonization	42.5	31
Citric acid	(EDA) hydrothermal treatment	80	32
CA+DAN (diaminonaphthalene)	Solvothermal synthesis	75%	33
CA+formamide	Microwave-assisted synthesis	16.2%	34
Acetic acid	Carbonization with P_2O_5	/	35
EDTA	Hydrothermal treatment	26.6	27
cadaverine	Hydrothermal treatment	5.4	27
Urea+PPD (p-phenylenedi-Amine)	Hydrothermal treatment	35%	36
Glucosamine	Hydrothermal treatment	/	37
o-PD, m-PD, p-PD	Solvothermal synthesis	10.4, 4.8 and 20.6%	38
DPA+o-PD	Hydrothermal treatment	26.3%	39
melamine	carbonization	86%	40
3-(3,4-dihydroxyphenyl)-L-alanine (L-DOPA)	Carbonization at 300 °C	/	41
Glycine	Hydrothermal treatment	30.6	27
L-histidine	Carbonization at 300 °C	/	41
histidine	Microwave-assisted pyrolysis	44.9	42
L-arginine	Carbonization at 300 °C	/	41
L-glutamic acid	pyrolysis	54.5	43
L-serine+L-cystine	Hydrothermal treatment	7%	44
Arg+EDA+NDA	MW-assisted hydrothermal synthesis	1%	45
Glucose	Soft-template MAH	15	46
Sucrose	carbonization	/	47
Organogel	Topochemical polymerisation	/	48
Benzene derivative：Polyphenylene	Solution chemistry	/	49

dendritic precursors			
Benzene derivative: pyrene	Hydrothermal treatment	23	50
Benzene derivative: polythiophene	Hydrothermal treatment	5.4	51
Benzene derivative: 1-(2-Pyridylazo)-2-naphthol+$CoCl_2$	Solvothermal synthesis	6.2%	52
Ionic liquid	Microwave oven	5.18	53
Chitosan	Hydrothermal treatment	43	54
Gelatine	Hydrothermal treatment	31.6	55
Grass	Hydrothermal treatment	6.2	56
Hair fiber	Chemical oxidation	11.1	57
Pemelo peels	Hydrothermal treatment	6.9	58
bagasse	Acidic oxidation	3	59
CA+Tris	Microwave-assisted synthesis	99%	60
CA+KH792	Hydrothermal treatment	97.32%	61

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