

Supplemental material

Structurally optimized intrinsic defect carbon driven polysulfide reduction reaction for quantum dot sensitized solar cells

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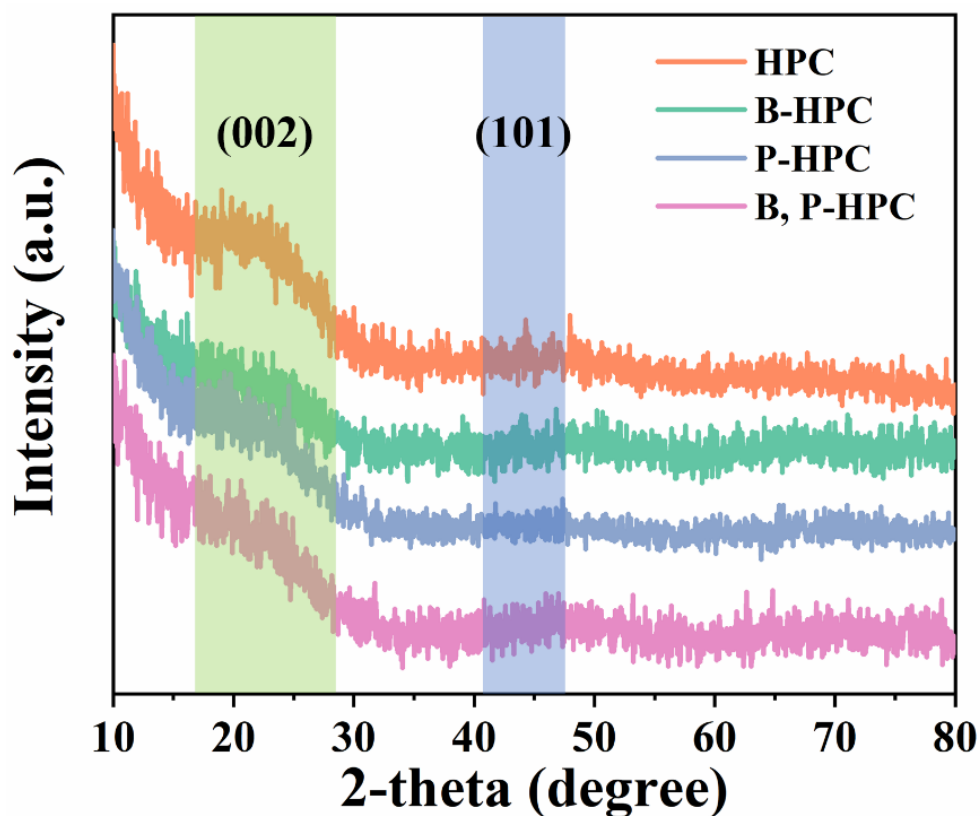


Figure S1 XRD pattern of all CE catalysts.

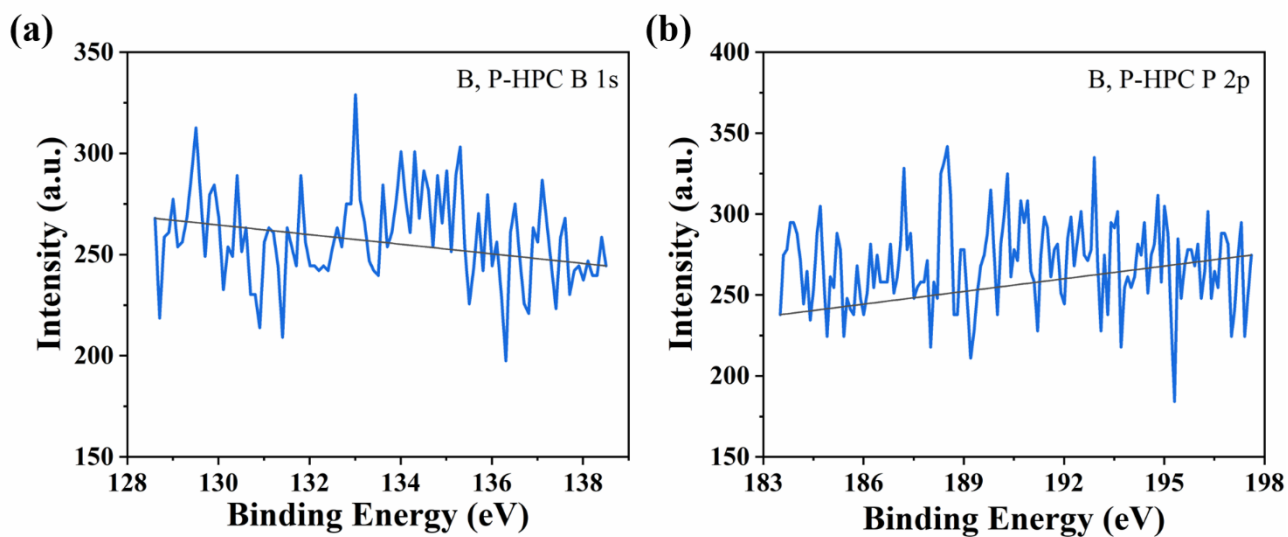


Figure S2 High-resolution B 1s and P 2p XPS spectra of B, P-HPC.

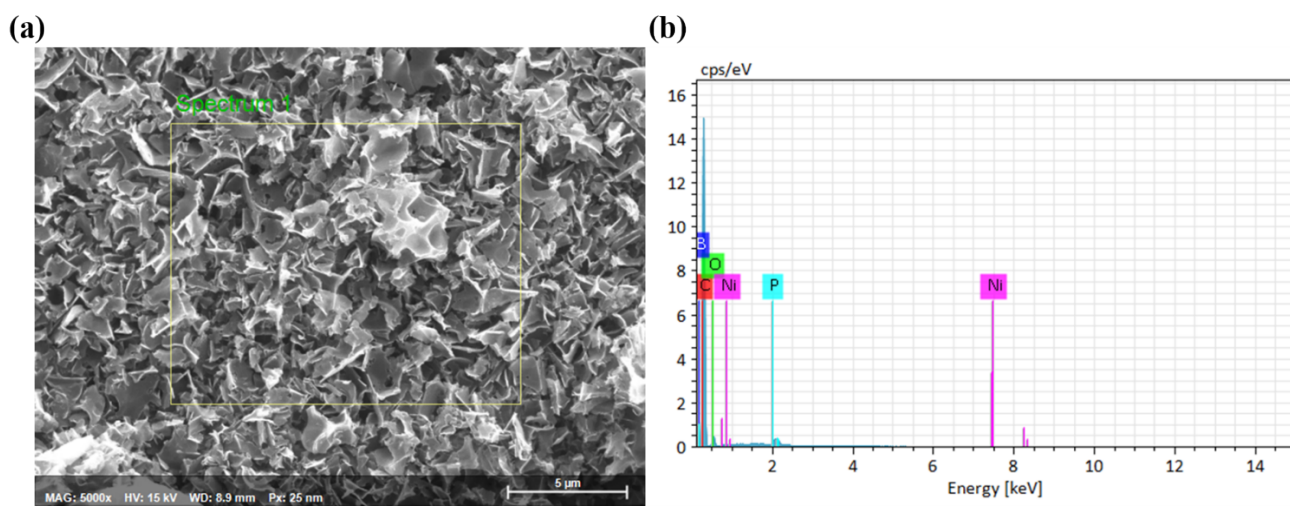


Figure S3 (a) SEM images and (b) EDS of B, P-HPC catalyst.

Table S1 XPS element ratio of HPC and B, P-HPC.

HPC Quantification				
	Atomic conc. [%]	Error [%]	Mass conc. [%]	Error [%]
C 1s	96.33	0.31	95.17	0.40
O 1s	3.67	0.31	4.83	0.40
B, P-HPC Quantification				
	Atomic conc. [%]	Error [%]	Mass conc. [%]	Error [%]
C 1s	95.52	0.30	94.15	0.38
O 1s	4.41	0.29	5.79	0.37
B 1s	0.07	0.07	0.06	0.06
P 2p	0.00		0.00	

Table S2 EDS parameters of B, P-HPC.

Elements	Atomic number	Normalized mass conc. (%)	Atomic conc. (%)
B	5	0.06	0.07
C	6	89.46	91.91
O	8	10.35	7.98
P	15	0.08	0.03
Ni	28	0.05	0.01

Table S3 Resistivity of all catalysts.

Catalysts	HPC	B-HPC	P-HPC	B, P-HPC
ρ ($\Omega \cdot \text{cm}$)	2.62	4.12	3.39	3.76

Table S4 Comparison of photoelectrochemical performances of CdS/CdSe/ZnS co-sensitized QDSSCs with different counter electrodes, and the EIS results (R_{ct}) for the symmetrical dummy cells ¹.

CEs	J_{sc} (mA ▪ cm ⁻²)	V_{oc} (V)	FF	PCE (%)	Active Area (cm ²)	R_{ct} (Ω ▪ cm ²)	Refs
B, P-HPC	16.03	0.52	0.55	4.62	0.25	0.56	This work
Iron sulfide/carbon	19.57	0.45	0.64	5.61	-	2.86	2
CB/Cu _x S-3	16.55	0.58	0.57	5.50	0.16	3.35	3
FTO/Cu ₂ S/PbS	18.08	0.55	0.54	5.28	0.16	0.19	4
Double-shelled							
Cu _{2-x} Se nanocages	16.42	0.67	0.43	4.76	0.20	2.94	5
CoS/NC-30	14.68	0.55	0.55	4.46	0.25	14.47	6
DW-Cu _{2-x} Se/Cu ₇ S ₄ -HNB	23.02	0.52	0.36	4.38	0.16	7.10	7
CuS2h	15.52	0.61	0.45	4.29	0.27	1.18	8
CuS 2h	14.31	0.60	0.49	4.27	-	-	9
rGO-Cu ₂ S (5)	17.20	0.56	0.44	4.26	0.16	0.75	10
HFCuS	15.37	0.61	0.45	4.25	-	-	11
PACuS4	13.35	0.59	0.53	4.20	-	-	12
Cu _x S C230	13.52	0.63	0.46	3.88	-	-	13
CoS	11.62	0.60	0.53	3.67	0.25	6.45	14
PbS	15.11	0.57	0.41	3.49	0.20	352.80	15
NiS120	11.67	0.60	0.47	3.25	0.27	7.96	16
CISE-20min	14.74	0.55	0.36	2.92	0.20	440	17
Cu ₂ S	6.89	0.57	0.25	1.01	0.16	-	18

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