Supporting Information

Curving effects of concave dodecahedral nanocarbons enable enhanced Li-ion storage

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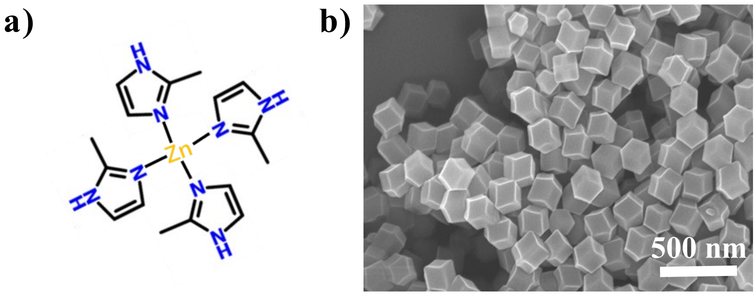

Figure S1. a) Molecular structure and b) SEM image ZIF-8 particles.

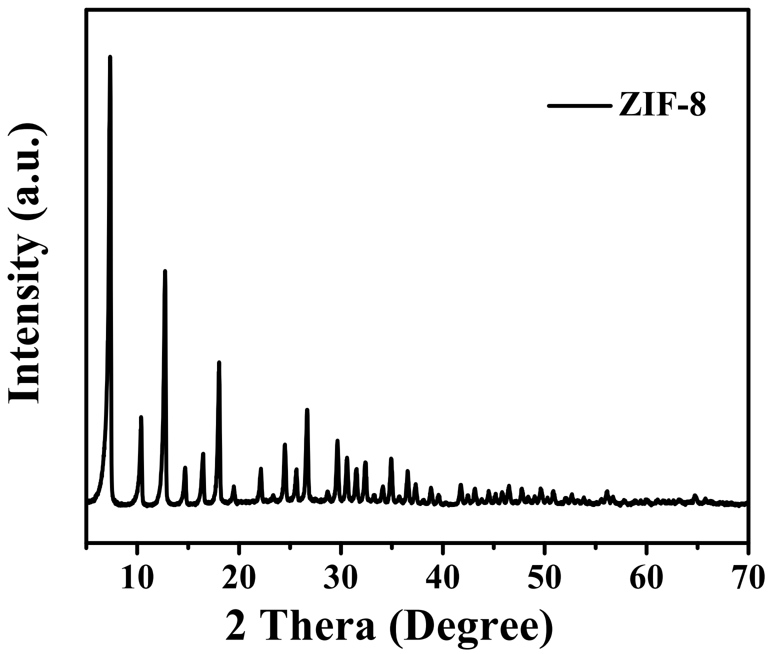

Figure S2. Experimental XRD patterns of ZIF-8.

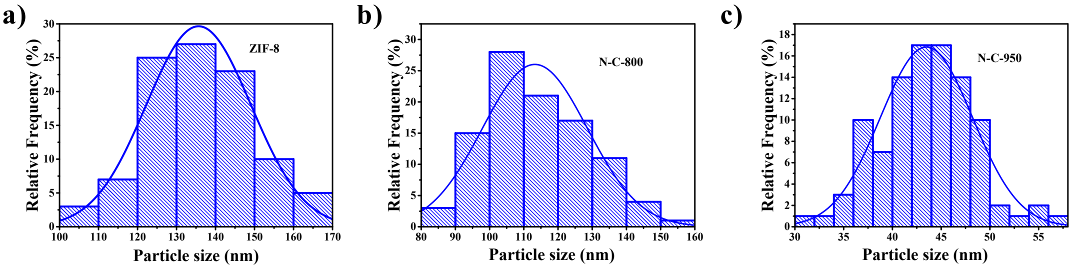

Figure S3. a-d) Size distribution of ZIF-8 nanocrystals, PDCs, CDCs, respectively.

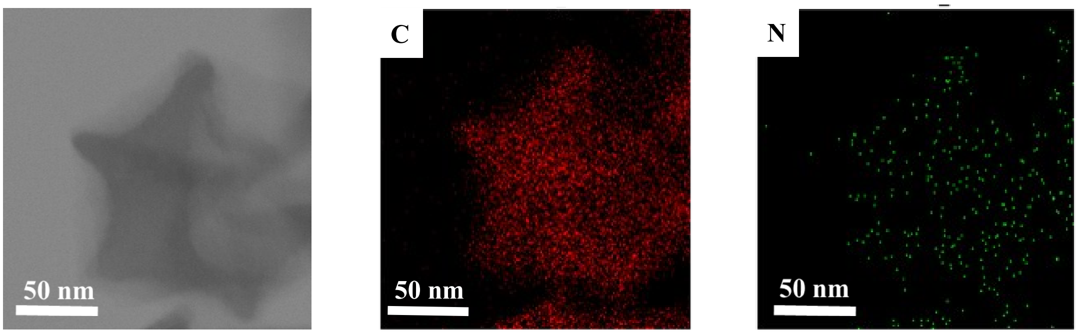

Figure S4. HAADF-STEM image and the corresponding C- and N-elemental maps of CDCs.

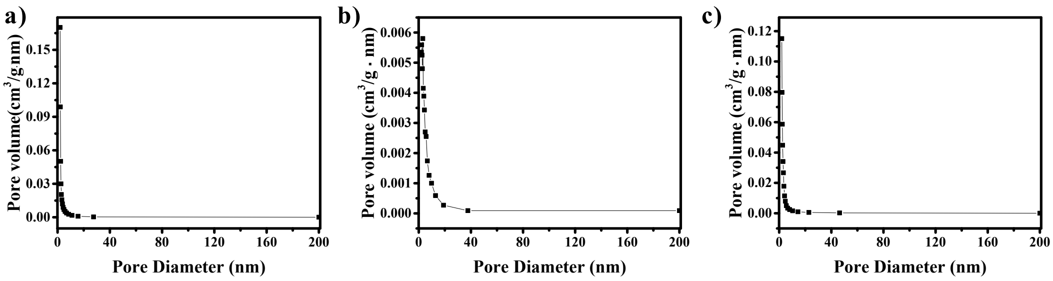

Figure S5. Pore size distribution of various samples: a) PDCs, b) CDCs, (c) BDCs, respectively.

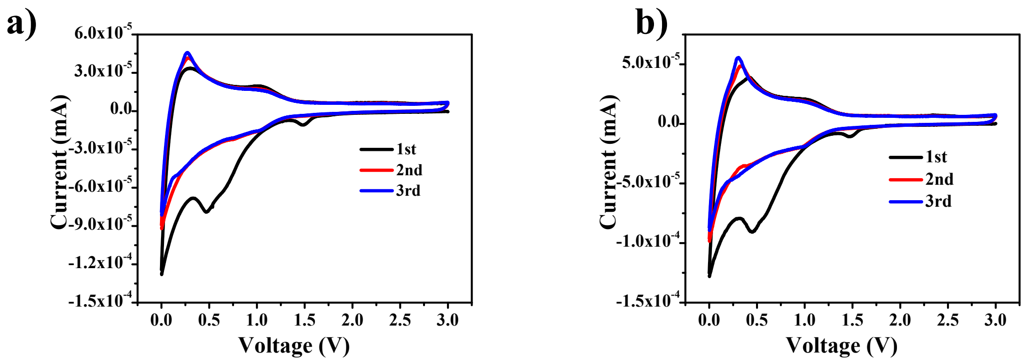

Figure S6. Cyclic voltammetry curve of a) PDCs and b) BDCs at a scan rate of 0.1 mV s^{-1}, respectively.

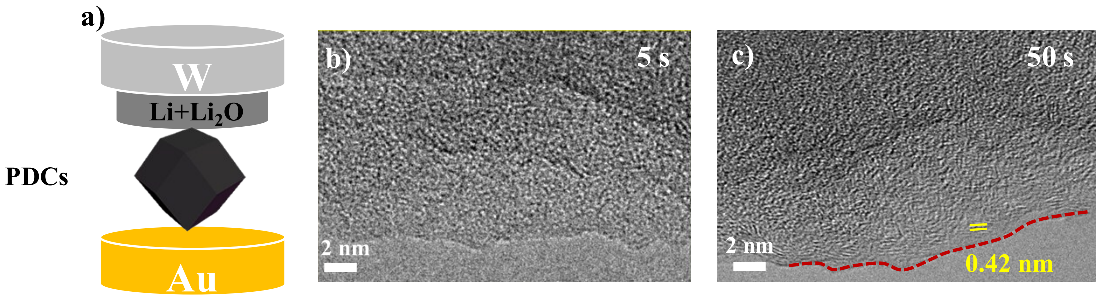

Figure S7. a) Schematic illustration of the *in situ* TEM experimental electrochemical setup. b, c) TEM images of the lithiated PDCs at different lithiation process: 5 and 50 seconds, respectively.

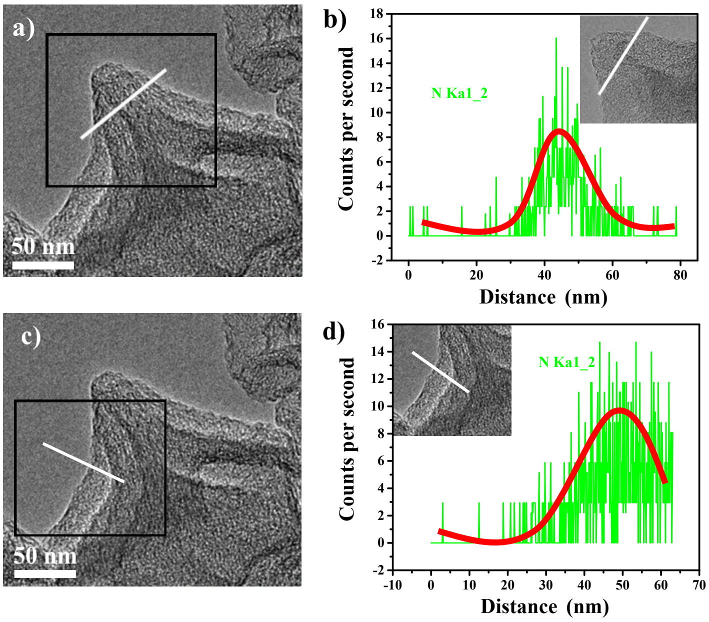

Figure S8. Line scanning of concave edge and protuberant vertex of a CDCs particle and the corresponding nitrogen intensity curves.

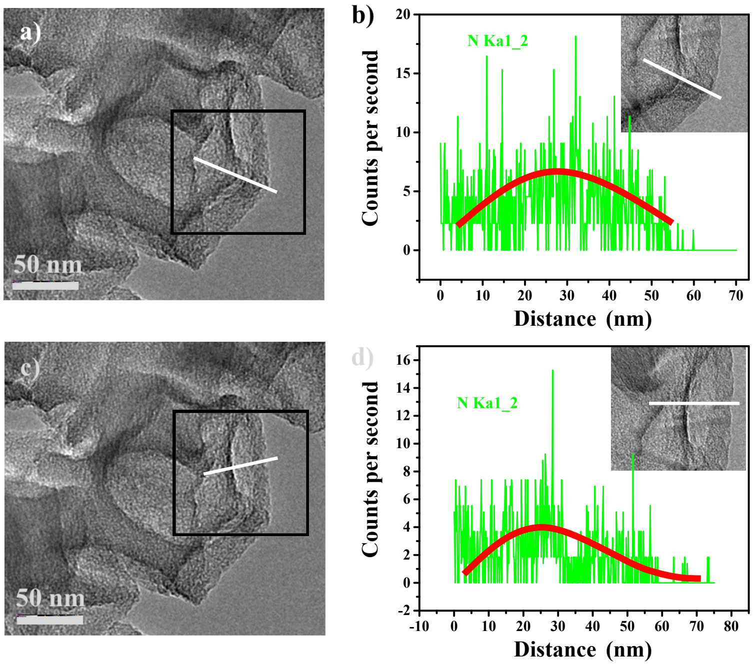

Figure S9. Line scanning of another concave edge and protuberant vertex of a CDCs particle and the corresponding nitrogen intensity curves.

Table S1. Comparison of the theoretical capacity of PDCs, CDCs and BDCs, respectively. The theoretical capacity of pyridinic nitrogen, pyrrolic nitrogen and graphitic nitrogen are 1262, 1198, 1087 mAh g^{-1}, respectively, based on DFT calculation in the literature search (J. Mater. Chem. 2012, 22, 8911). The theoretical capacity of carbon is 372 mAh g^{-1} based on graphite. All contents of carbon and nitrogen (including pyridinic, pyrrolic and graphitic species) are based on XPS measurement. The equation of theoretical capacity of dodecahedral is listed as follows:

Theoretical capacity = Content of carbon × 372 mAh g^{-1} + Content of total nitrogen × [Pyridinic N × 1262 mAh g^{-1} + Pyrrolic N × 1198 mAh g^{-1} + Graphitic N × 1087 mAh g^{-1}]

Dodecahedral carbons	Content of carbon	Content of total nitrogen	Pyridinic N of the total nitrogen	Pyrrolic N of the total nitrogen	Graphitic N of the total nitrogen	Theoretical capacity (mAh g^{-1})
PDCs	0.9171	0.0829	0.4479	0.3533	0.1988	441
CDCs	0.9697	0.0303	0.0956	0.6889	0.2155	396
BDCs	0.9720	0.0280	0.3045	0.0817	0.6138	394