Supporting Information

Nitrogen-doped Graphene-like Carbon Nanosheets from Commercial Glue: Morphology, Phase Evolution and Li-ion Battery Performance

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Fig. S1 (a) FTIR spectrum of as-dried (PECA-NaCl) powder sample and (b) XRD of as-dried sample showing the characteristic reflections corresponding to NaCl.

The characteristic peaks of ECA monomer at 3130 cm⁻¹ (stretching of vinyl group, =C-H) and 1615 cm⁻¹(C=C stretching) (**Fig. S1a**) disappear as the polymerization completes and no ECA monomer remains. In our case, we see that the peak at 3130 cm⁻¹ vanishes completely, however, the peak at 1615 cm⁻¹ is still present. It has been suggested that chain transfer reaction results in -C=C at the end of polymer chain. Thus, the FTIR data of as-dried sample shows that the sample is fully polymerized with no traces of ECA monomer. A small absorption peak at 2360 cm⁻¹ was also seen, which corresponds to asymmetric bond stretching of CO₂. This peak typically appears due to the background artifact in IR spectroscopy. X-ray diffraction technique was used to measure the crystallinity of as-dried sample. **Fig. S1b** shows high intensity reflections at 27.4, 31.7, 45.5, 56.5, 66.2, 73.06, 75.3 and 84.0 degrees were seen which correspond to (111), (200), (220), (222), (400), (331), (420) and (422) planes of NaCl, respectively (JCPDS No: 050628). The relative intensity of these reflections differs significantly from the standard XRD pattern of NaCl which suggests that crystal habit modification of NaCl crystals takes place in the as-dried samples. XRD pattern contains no characteristic peak which correspond to PECA.



Fig. S2 FESEM images of CNSs, (a) and (b) N-CNSs-600 and (c) and (d) N-CNSs-800.



Fig. S3 FESEM image of poly ethylcyanoacrylate sample carbonized at 1000 °C (CA-1000).

at low (a) and intermediate (b) magnifications, (c) Higher magnification TEM image of CA-1000



Fig. S4 Raman spectrum of N-CNS, carbonized at 600°C (black), 800°C (red) and 1000°C (blue).



Fig. S5 UV-Visible spectrum of N-CNSs-1000 sample.



Fig. S6 Fine scanned C1s, N1s and O1s spectra of N-CNSs-600 (a), (b) and (c), N-CNSs-800 (d), (e) and (f) and N-CNSs-1000 (g), (h) and (i), respectively.



Fig. S7 Compositional analysis of Carbon, Oxygen and Nitrogen in N-CNSs carbonized at different temperatures.



Fig. S8 Differential scanning calorimetry of as-dried (PECA-NaCl) powder sample. The Pink dotted box represents temperature range in which decomposition of PECA takes place. The green box represents temperature range in which melting of NaCl takes place.



Fig. S9 Cyclic voltammogram (1st and 2nd cycles) of N-doped graphene-like carbon nano-sheets carbonized with NaCl under argon at 1000 °C (N-CNS-1000).



Fig. S10 Voltage profiles of N-doped graphene-like carbon nano-sheets carbonized with NaCl under argon at 1000 °C (N-CNS-1000) (a), 800 °C (N-CNS-800) (b), 600 °C (N-CNS-600) (c) and without NaCl (CA-1000) (d).



Fig. S11 EIS of the N-doped graphene-like carbon nano-sheets carbonized with NaCl under argon at 600 °C (N-CNS-600), 800 °C (N-CNS-800), 1000 °C (N-CNS-1000), and without NaCl.