Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supplementary Information

Structural evolution and electrocatalytic application of nitrogen-doped carbon shells synthesized by pyrolysis of near-monodisperse polyaniline nanospheres

Zhibin Lei,[a,b,] * Mingyi Zhao,[a] Liqin Dang,[a] Lizhen An,[a] Min Lu,[a] An-Ya Lo,[b] Ningya Yu,[b] and Shang-Bin Liu[b,] *

[a]*Institute of Chemistry for Functionalized Materials, Faculty of Chemistry and Chemical Engineering, Liaoning Normal University, Dalian, Liaoning 116029, China.*

[b]*Institute of Atomic and Molecular Sciences, Academia Sinica, P. O. Box 23-166, Taipei 10617, Taiwan.*

*Corresponding Authors:
Prof./Dr. Zhibin Lei, Fax: +86-411-82156858; E-Mail: zblei@lnnu.edu.cn.
Prof./Dr. Shang-Bin Liu, Fax: +886-2-2362-0200; E-Mail: sbliu@sinica.edu.tw.

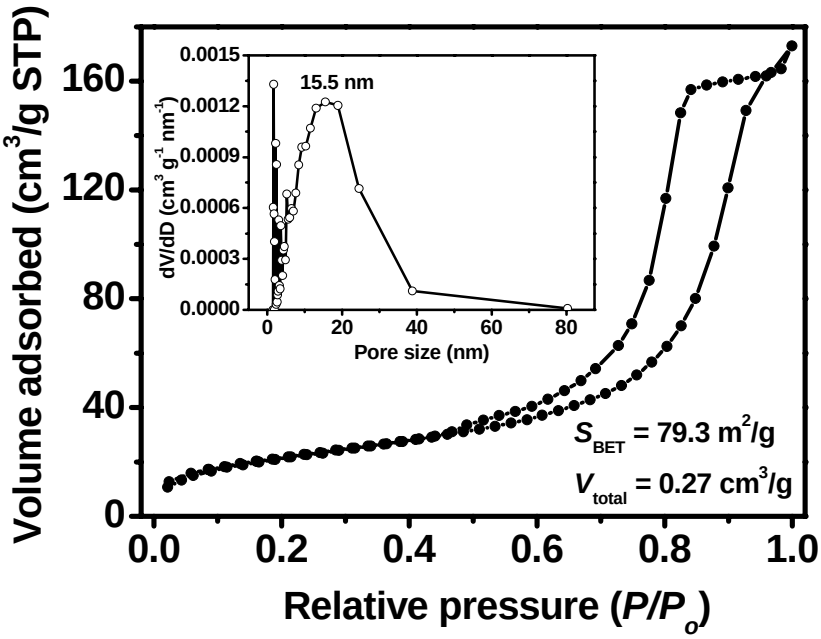

Fig. S1 N_2 adsorption/desorption isotherms (77 K) and the corresponding BJH pore size distribution (inset) of the PANI-1.5 colloidal spheres.

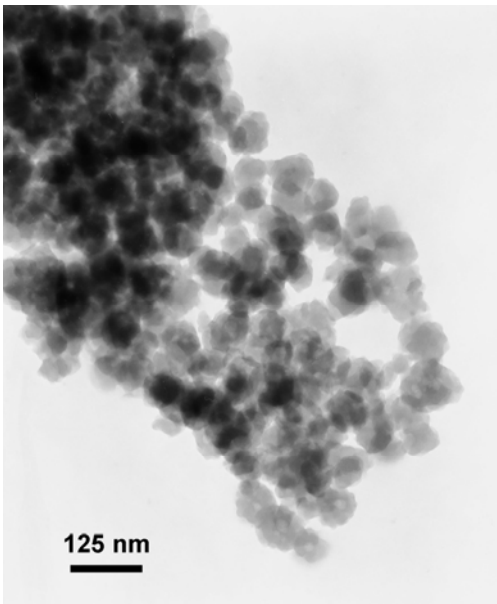

Fig. S2 TEM images of NCS-1.5-400 synthesized by pyrolyzing the PANI-1.5 colloids at 400 °C.

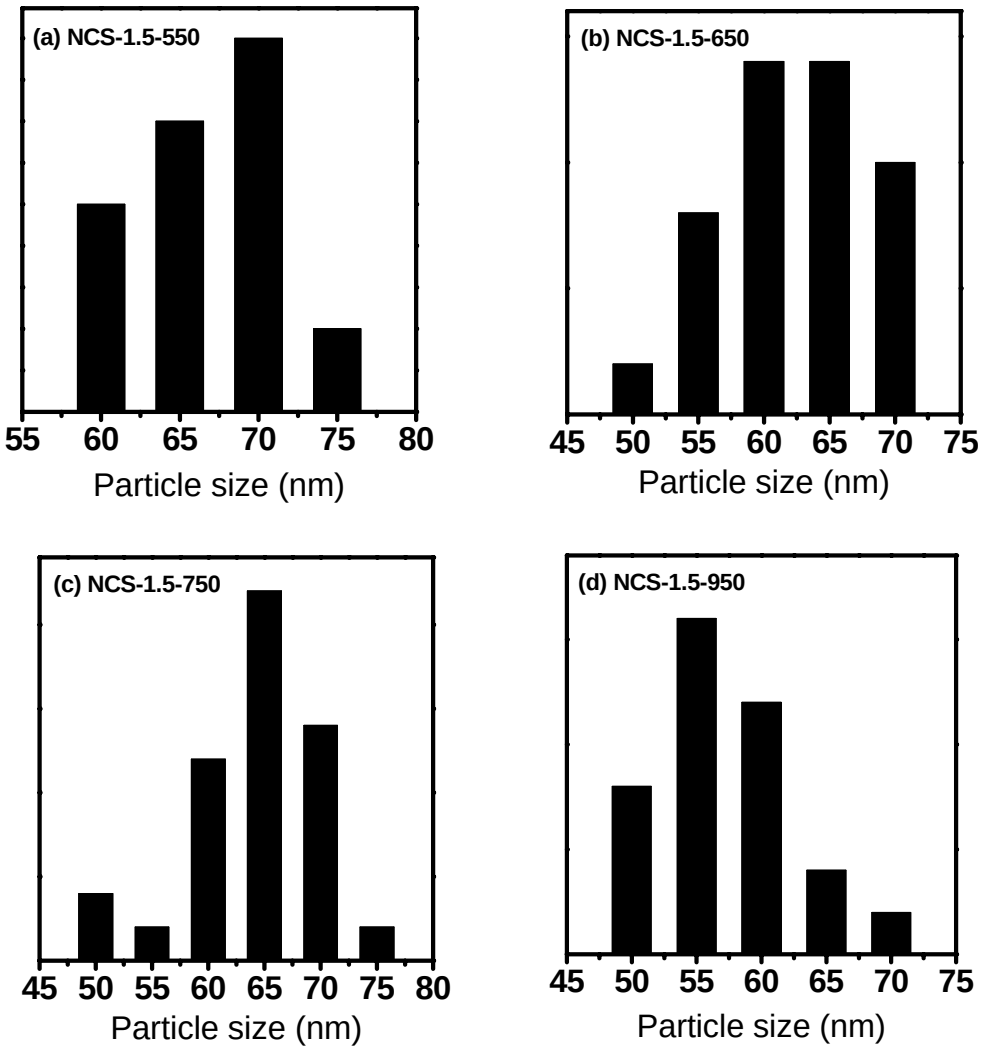

Fig. S3 Particle size distribution of various NCS-1.5-*y* samples synthesized at different pyrolysis temperature *y* = (a) 550 ^{o}C, (b) 650 ^{o}C, (c) 750 ^{o}C, and (d) 950 ^{o}C.

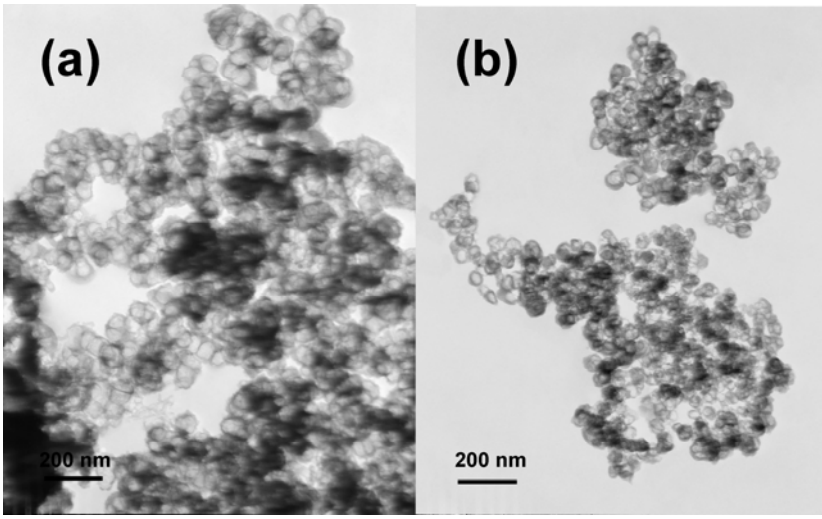

Fig. S4 TEM images of (a) NCS-0.7-950 and (b) NCS-2.0-950 synthesized at a pyrolysis temperature of 950 ^{o}C using PANI-0.7 and PANI-2.0 colloids as template and precursor, respectively.

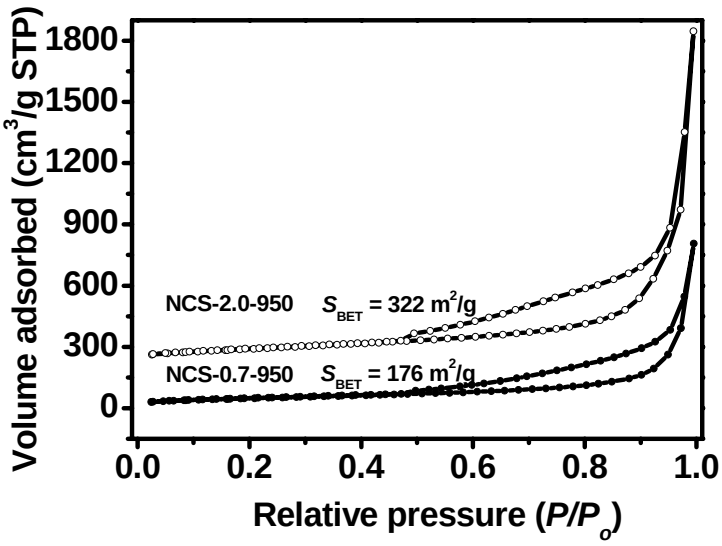

Fig. S5 N_2 adsorption/desorption isotherms of NCS-0.7-950 and NCS-2.0-950 synthesized at a pyrolysis temperature of 950 ^{o}C using PANI-0.7 and PANI-2.0 colloids as template and precursor, respectively. The isotherm for NCS-2.0-950 was offset vertically by 200 cm^3/g at STP.

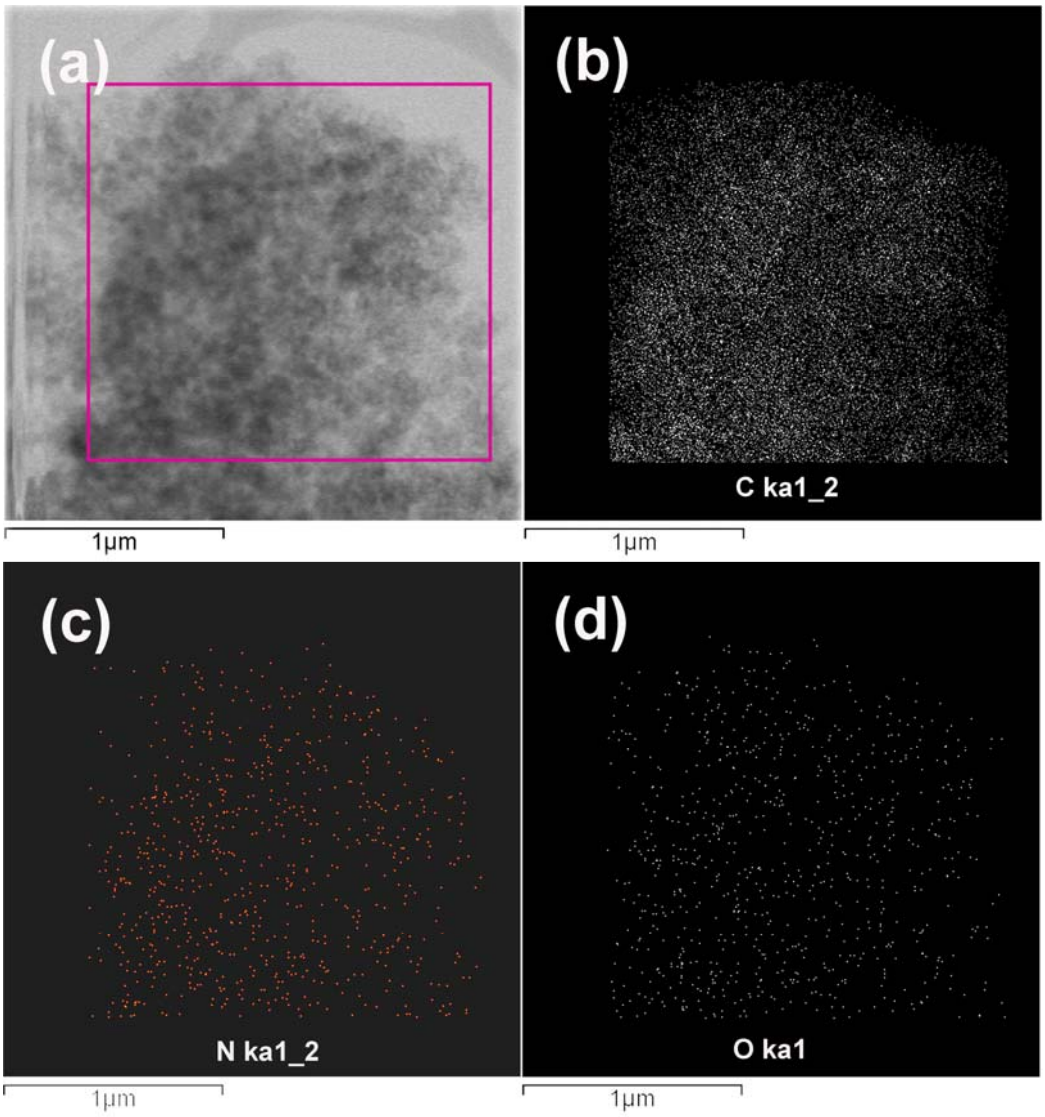

Fig. S6 STEM image of (a) NCS-1.5-950 and the corresponding elemental mappings of elements (b) C, (c) N, and (d) O.

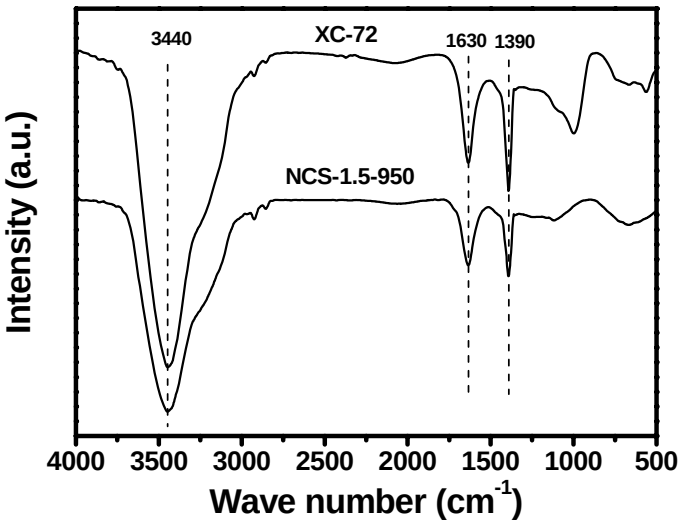

Fig. S7 FTIR spectra of NCS-1.5-950 and XC-72.