Electronic Supplementary Information

Shrimp-shell Derived Carbon Nanodots as Carbon and Nitrogen Source to Fabricate Three-dimensional N-doped Porous Carbon Electrocatalyst for Oxygen Reduction Reaction

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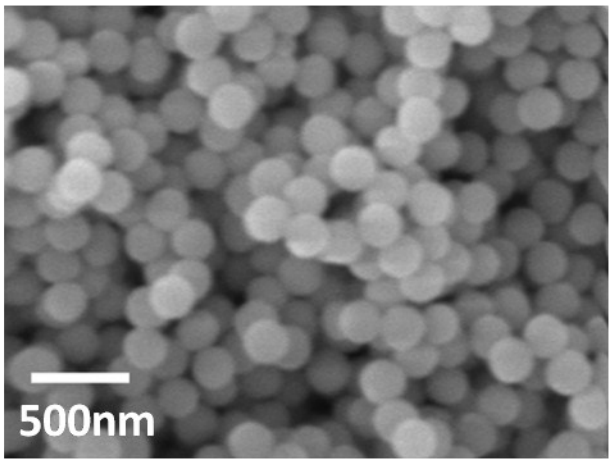

Fig. S1 SEM image of surface acidification treated SiO_2 spheres with an average diameter of ~200 nm.

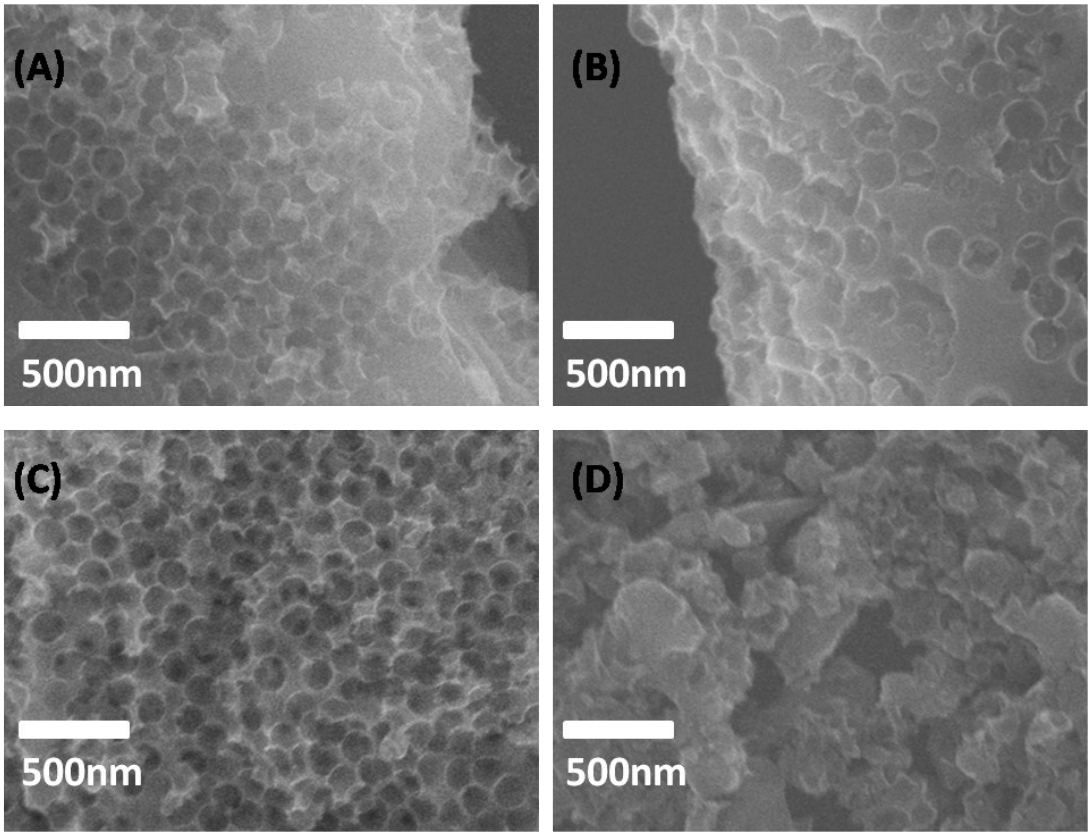

Fig. S2 Surface SEM images of pyrolytic carbon products obtained at 500 °C (A), 600 °C (B), 700 °C (C) and 900 °C (D).

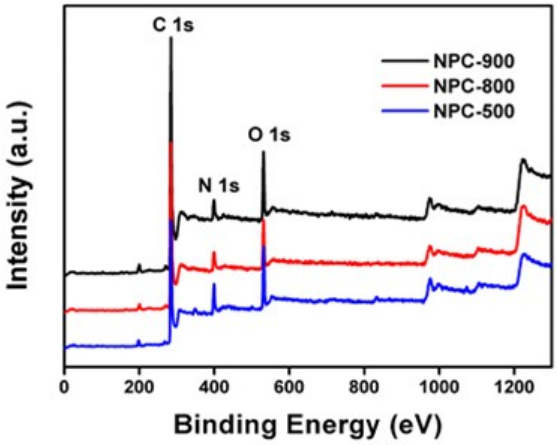

Fig. S3 Surface survey XPS spectra of pyrolytic carbon products obtained at 500 °C, 800 °C and 900 °C (denoted as NPC-500, NPC-800 and NPC-900).

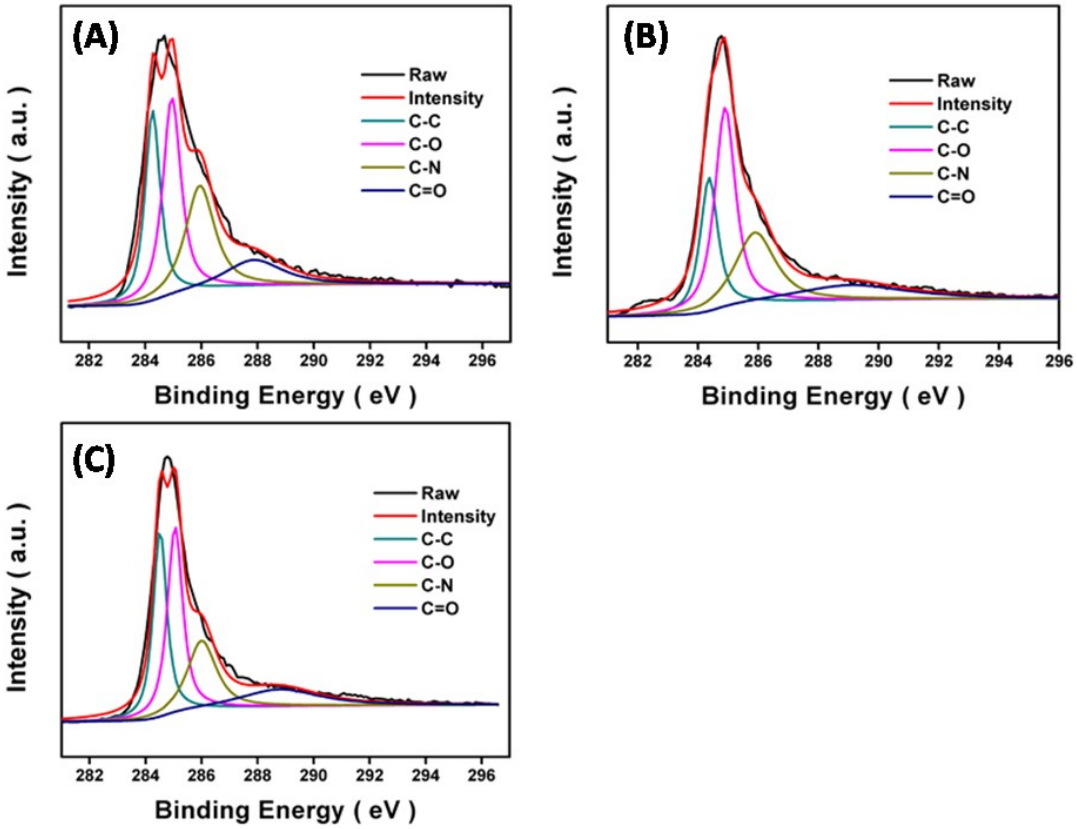

Fig. S4 High resolution C 1s XPS spectra of NPC-500 (A), NPC-800 (B) and NPC-900 (C).

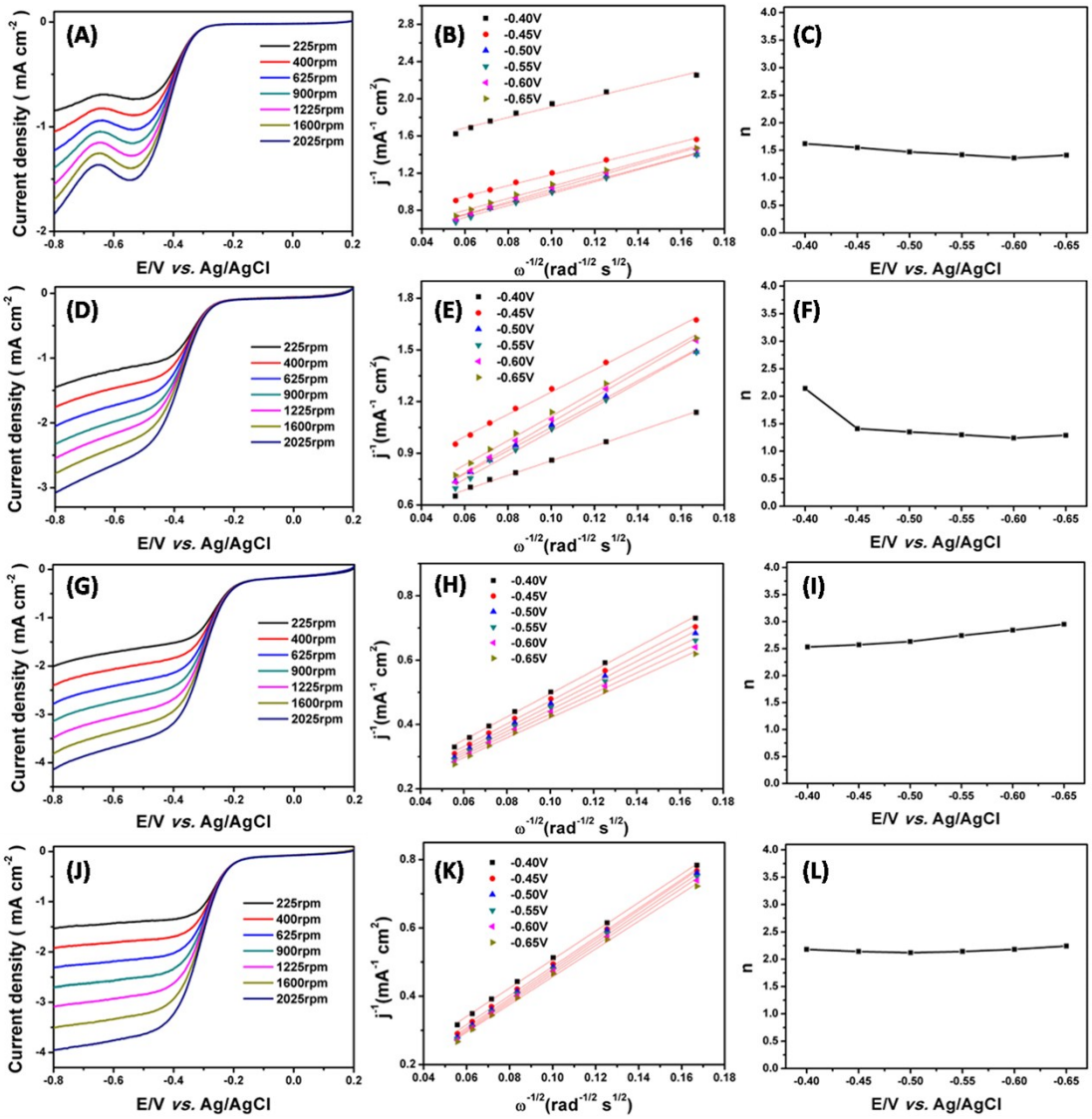

Fig. S5 Linear sweep voltammogram (LSV) curves at different rotation speeds, corresponding K−L plots and electron transfer numbers over the potential range of -0.4 V to -0.65 V of NPC-500 (A, B, C), NPC-600 (D, E, F), NPC-700 (G, H, I) and NPC-900 (J, K, L). The electrolyte is O_2-saturated 0.1 M KOH solution and the scan rate is 10 mV s^{-1}.

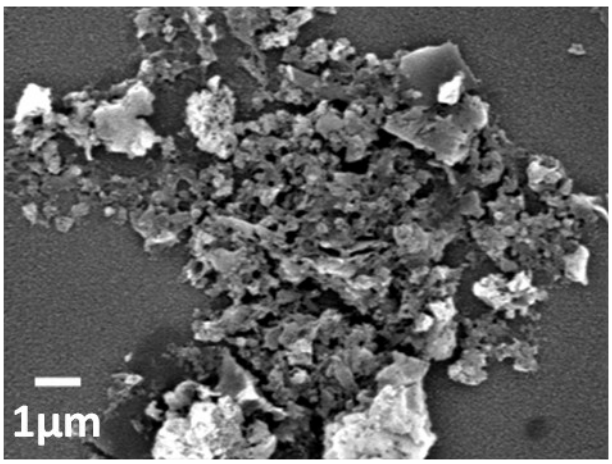

Fig. S6 SEM image of N-doped carbon material obtained by direct pyrolysis of shrimp-shell derived N-doped carbon nanodots without SiO_2 spheres at 800 °C (NC-800).