Electronic Supplementary Information

Core-shell Co@Co₃O₄ Nanoparticles-Embedded Bamboo-like Nitrogen-doped Carbon Nanotubes (BNCNTs) as a Highly Active Electrocatalyst for Oxygen Reduction Reaction

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Figure SI-1. XRD pattern of the Co/bamboo-like N-doped carbon nanotubes (BNCNTs) composite, which is in accordance with the standard pattern of Co (JCPDS 00-015-0806).
Figure SI-2. EDX spectrum of the Co/bamboo-like N-doped carbon nanorods (BNCNTs) composite.
Figure SI-3. The Co 2p XPS spectrum of Co/bamboo-like N-doped carbon nanorods (BNCNTs).
Figure SI-4. (A) TEM image and (B) XRD pattern of Co$_3$O$_4$/carbon nanotubes (CNTs).
Figure SI-5. Linear scan voltammogram (LSV) curves of the Co@Co$_2$O$_4$/BNCNTs-300, Co/BNCNTs-300, and BNCNTs catalysts in O$_2$-saturated 0.1 M KOH at a scan rate of 5 mV s$^{-1}$ and a rotating rate of 2400 rpm. The Co@Co$_2$O$_4$/BNCNTs-300 catalyst is treated in 0.5 M H$_2$SO$_4$ aqueous solution to form Co/BNCNTs-300, and is further treated in the mixed acid of concentrated HNO$_3$ and HCl to form BNCNT-300.
Figure SI-6. (A) TEM and (B) HRTEM images of BNCNTs-300 obtained from the acidic treatment of Co@Co$_3$O$_4$/BNCNTs-300 in the mixed acid of concentrated HNO$_3$ and HCl. The lattice fringes with an interlayer distance of 0.34 nm is agreement with the interlayer spacing of graphitic structure.