Electronic Supplementary Material (ESI) for Nanoscale.

Supporting information

Revealing the Synergetic Effects in Ni Nanoparticle-Carbon Nanotube Hybrids by Scanning Transmission X-ray Microscopy and Their Application in the Hydrolysis of Ammonia Borane

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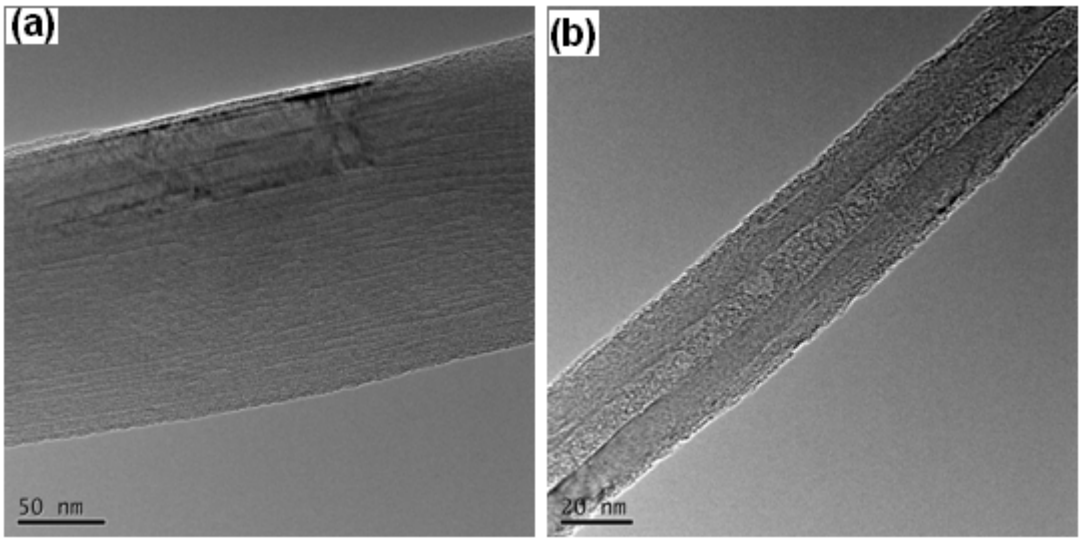

Figure S1: Magnified TEM images of (a) thick and (b) thin CNTs.

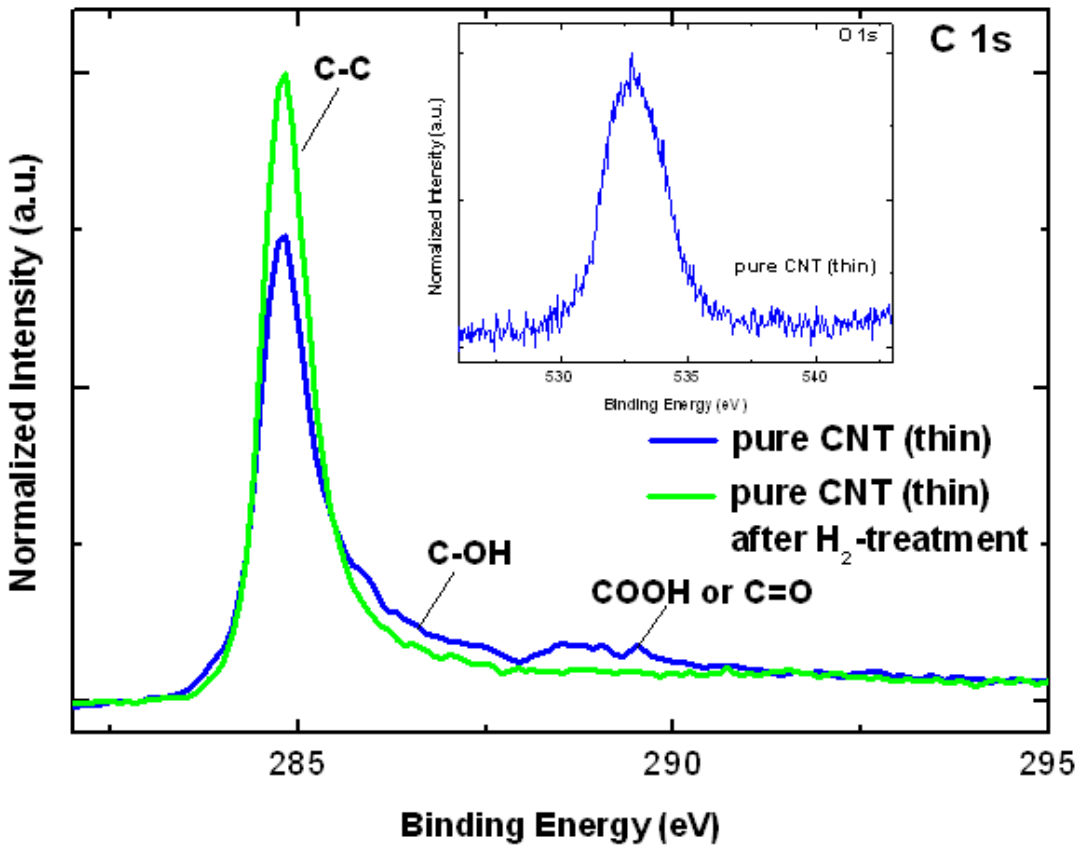

Figure S2: C 1s XPS results of pure CNT (thin) and pure CNT (thin) after H_2-treatment. The inset shows the O 1s XPS data of pure CNT (thin).

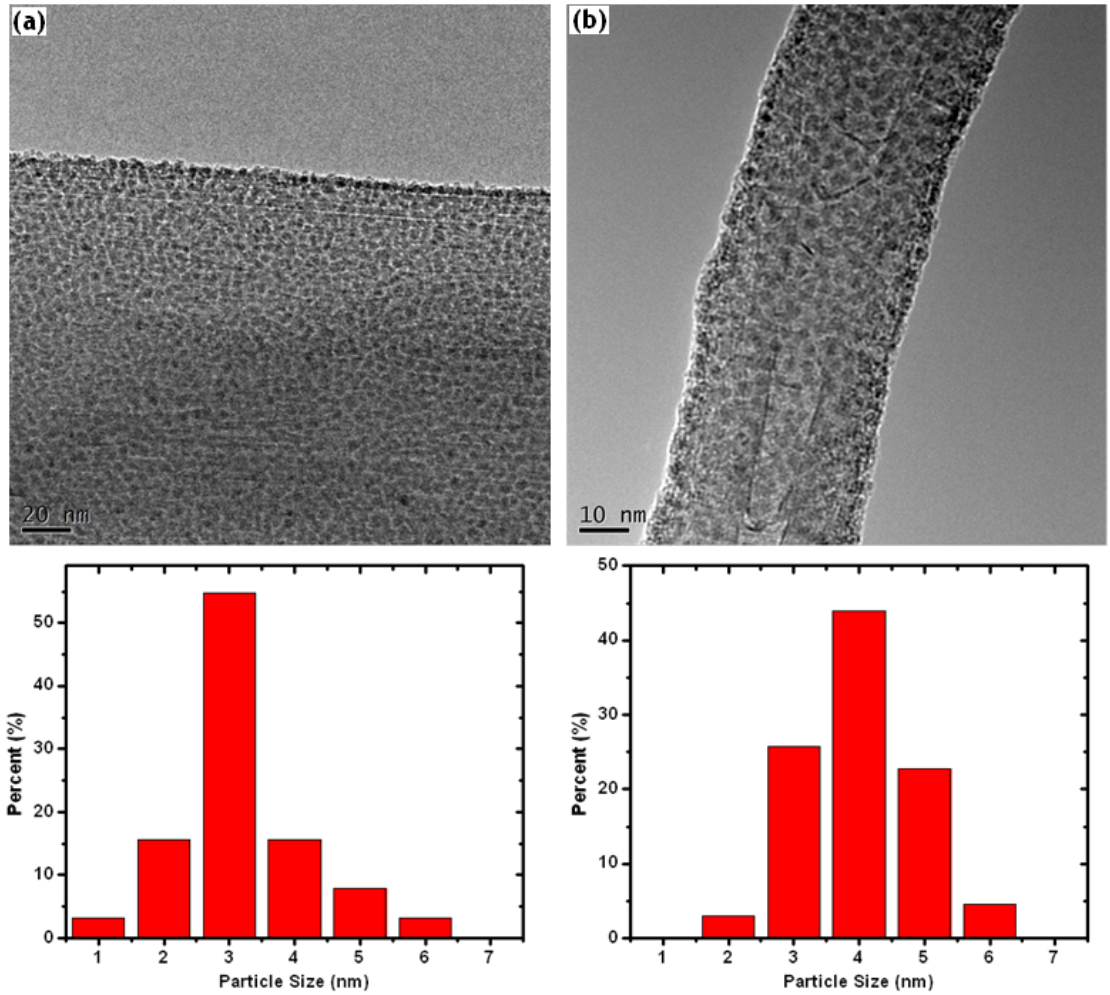

Figure S3: High resolution TEM images of (a) Ni-CNT (thick) and (b) Ni-CNT (thin). The bottom panels show the particle size distributions. The average particle size in Ni-CNT (thick) is 3 nm while it is 4 nm in Ni-CNT (thin).

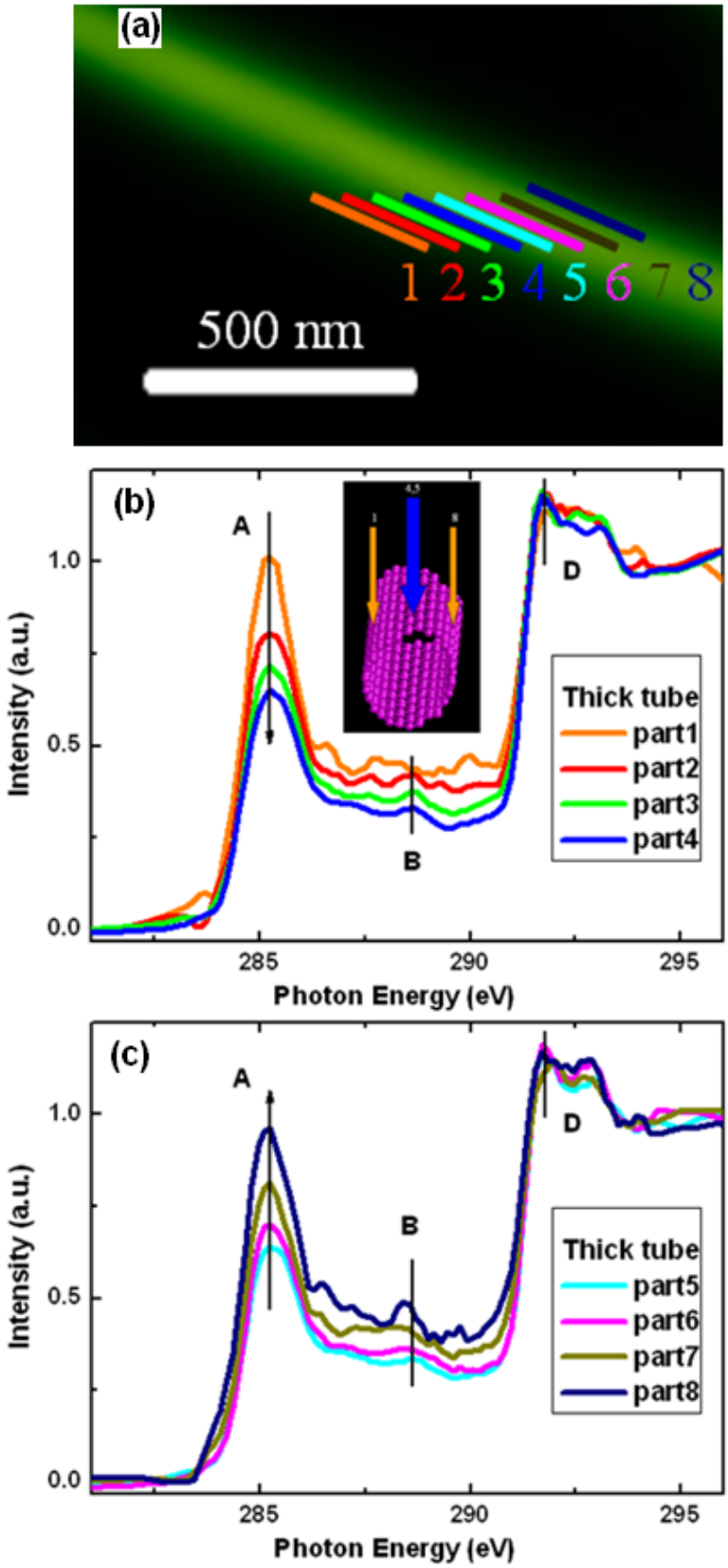

Figure S4: (a) STXM map of a thick tube; (b) and (c): C *K*-edge XANES spectra of a thick tube measured at different positions (1-8).

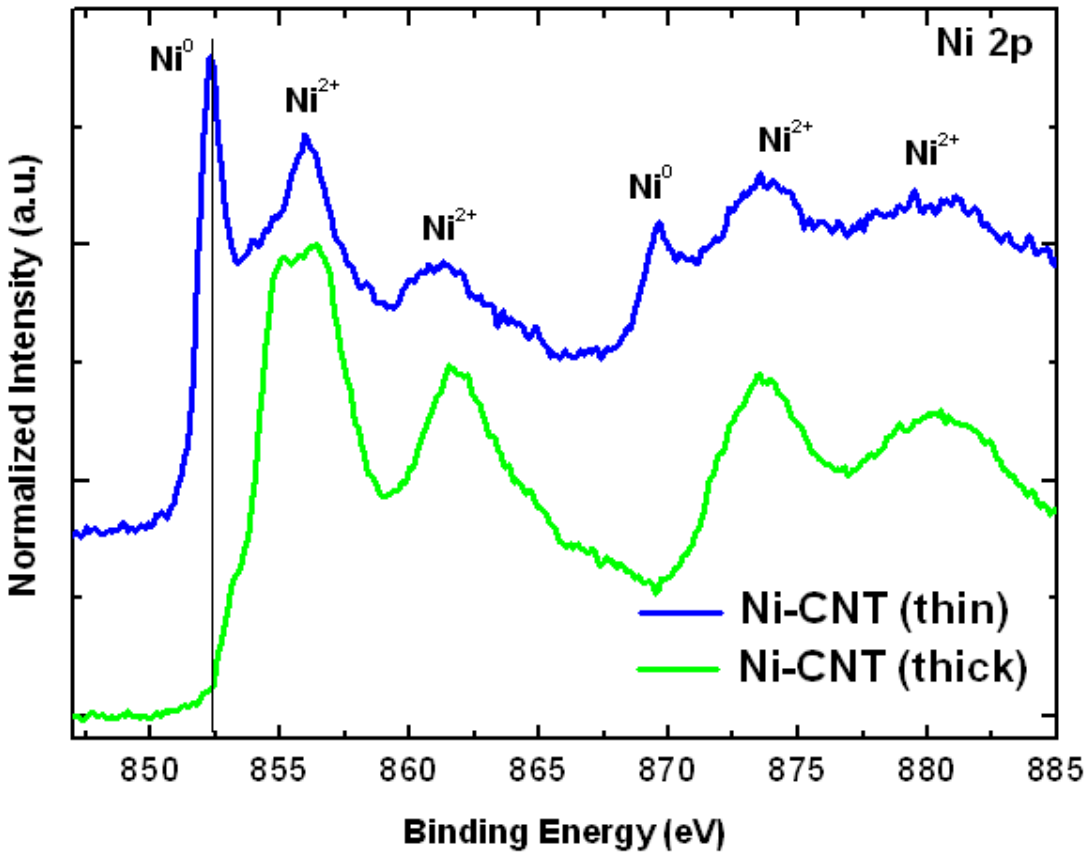

Figure S5: Ni 2p XPS results of Ni-CNT (thin) and Ni-CNT (thick).

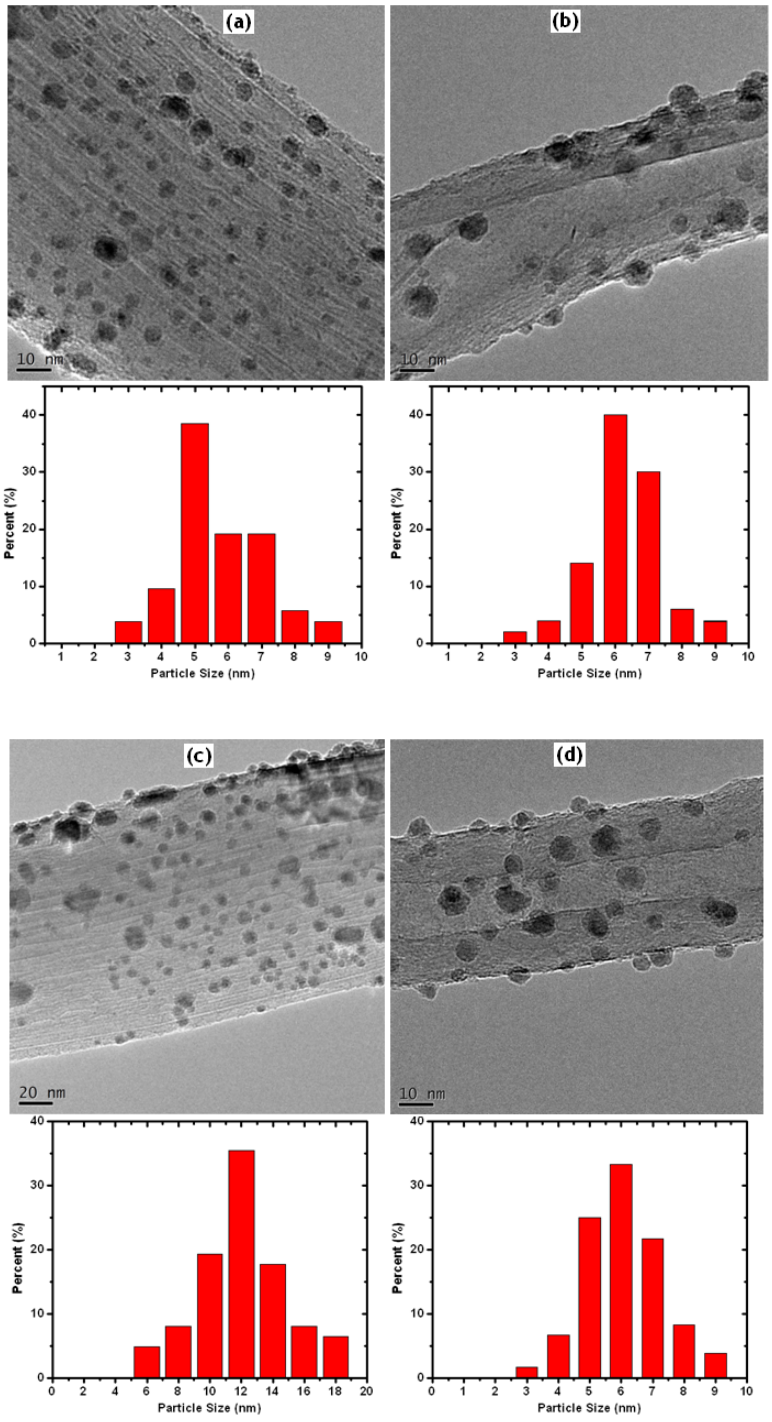

Figure S6: High resolution TEM images of (a) NiO-CNT-H_2 (thick), (b) NiO-CNT-H_2 (thin), (c) NiO-CNT-Ar (thick), and (d) NiO-CNT-Ar (thin). The bottom panels show the particle size distributions. The average particle sizes in NiO-CNT-H_2 (thick), NiO-

CNT-H_2 (thin), NiO-CNT-Ar (thick), and NiO-CNT-Ar (thin) are 6 nm, 6 nm, 12 nm, and 6 nm, respectively.

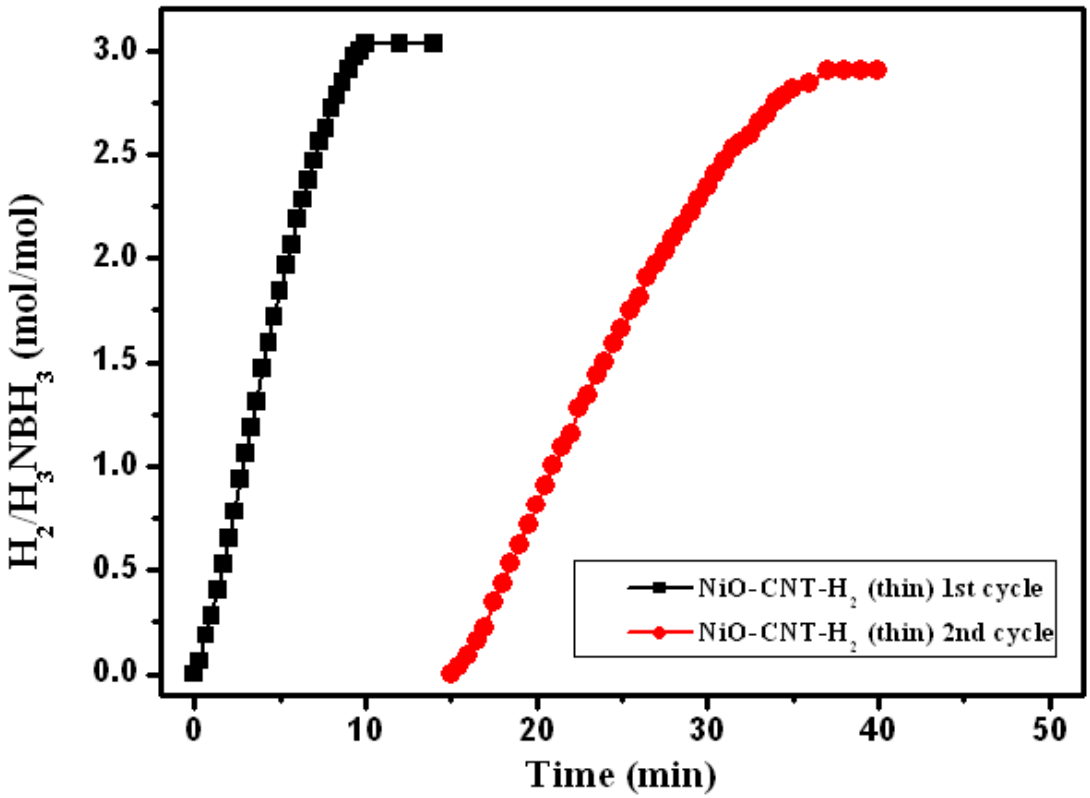

Figure S7: Stability test of NiO-CNT-H_2 (thin) in 2 runs for the hydrolysis of AB. The TOF value decreases from 19.07 to 7.2 (about 40% left).