

Electronic Supporting Information for

Nanoporous cobalt foam and Co/Co(OH)₂ core-shell structure for electrochemical applications

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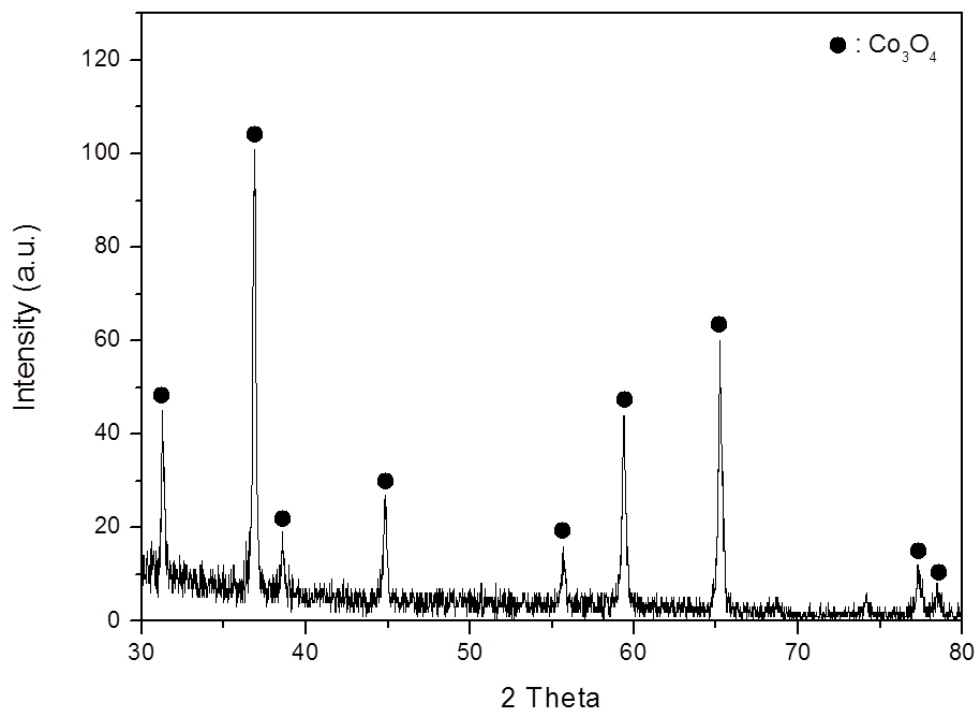


Figure S1. X-Ray diffraction patterns of the CNT/Co₃O₄ nanocomposite powder. The all detected peaks were indicated Co₃O₄ (JCPDS Card No. 43-1003).

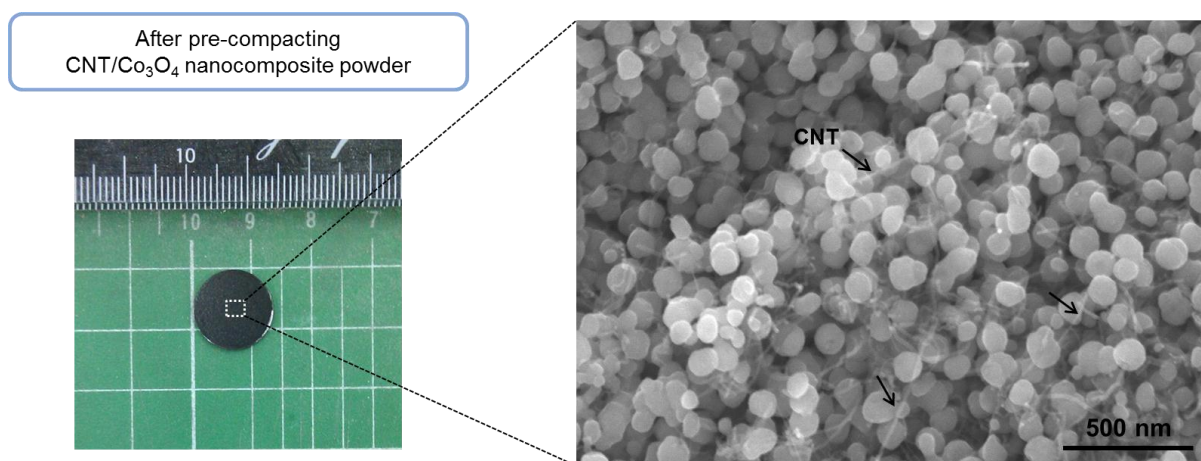


Figure S2. The picture and SEM image of the pre-compacted CNT/Co₃O₄ nanocomposite powder.

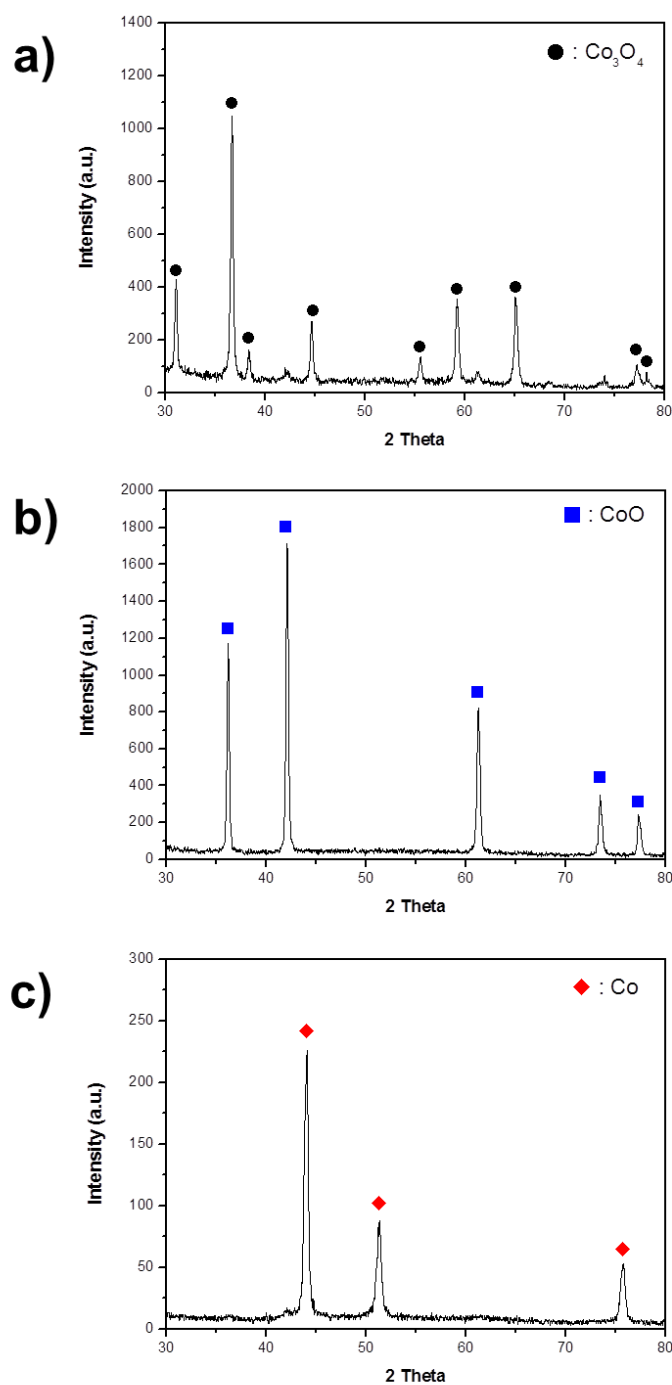


Figure S3. a) XRD patterns of the consolidated Co_3O_4 nanoparticles at 750 °C, 10 h, b) XRD patterns of the consolidated CNT/ Co_3O_4 nanocomposite powder at 650 °C, 5 h and c) XRD patterns of the consolidated CNT/ Co_3O_4 nanocomposite powder at 650 °C, 10 h.

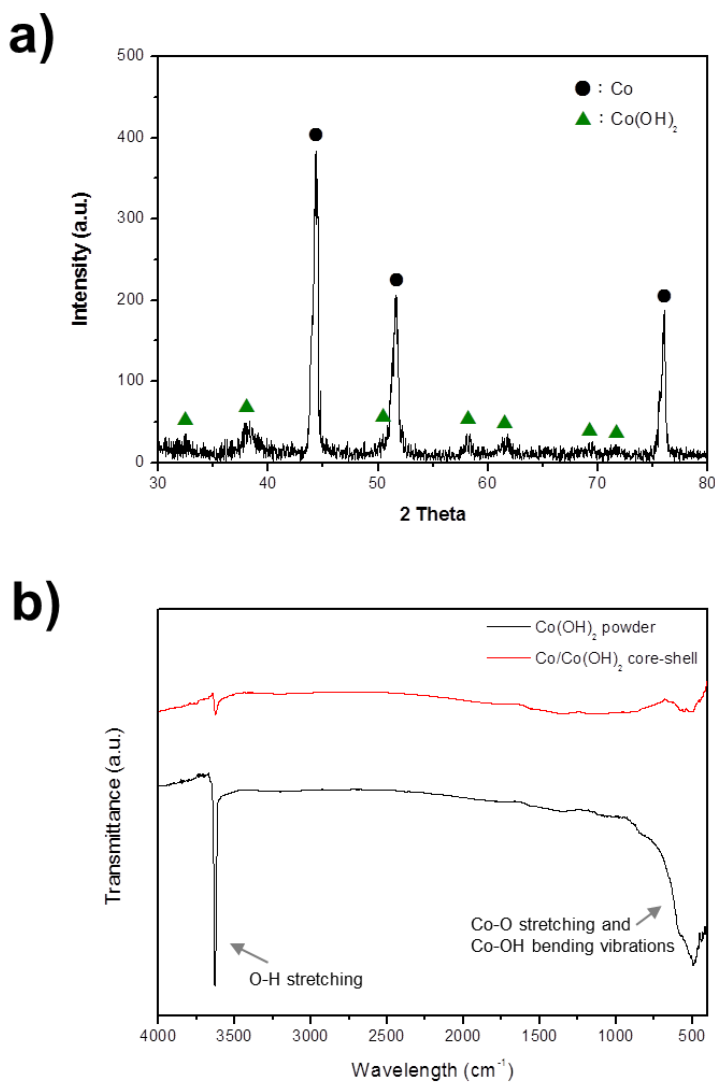


Figure S4. a) The X-ray diffraction analysis of the Co/Co(OH)₂ core-shell structure. The Major cobalt peaks appeared from nanoporous cobalt foam and the minor patterns exhibit the typical diffraction peaks of the β -Co(OH)₂ (JCPDS Card No. 30-0443), b) The FT-IR analysis of Co/Co(OH)₂ core-shell structure shown peaks from O-H stretching (3630 cm⁻¹) and Co-O stretching and Co-OH bending vibrations in the brucite-like octahedral sheet (400-600 cm⁻¹), which indicating β -Co(OH)₂ phase.²⁹

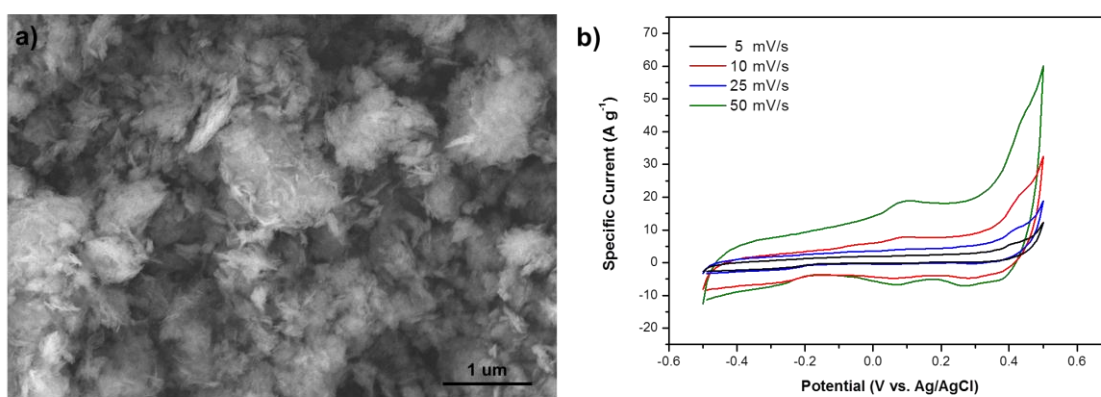


Figure S5. a) SEM image of the Co(OH)_2 flakes which synthesized for a control experiment, b) The cyclic voltammograms of the Co(OH)_2 electrode with various scan rate. The specific capacitances calculated from the CV curves are 468.5, 435.1, 420.2, and 408.1 F g^{-1} for scan rates of 5, 10, 25, and 50 mV s^{-1} , respectively.

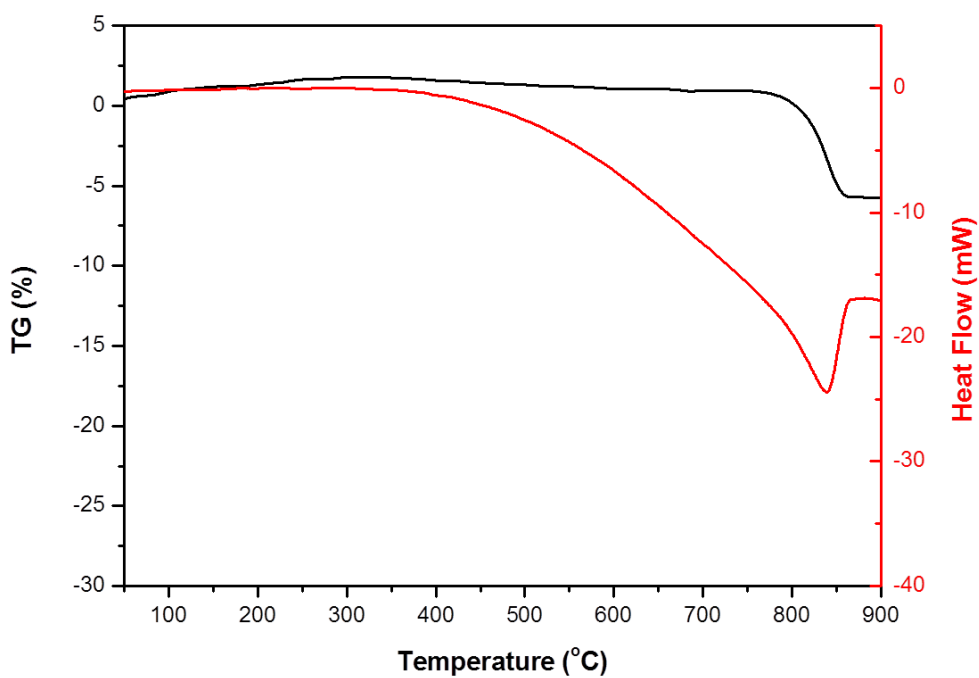


Figure S6. TG-DSC curves for Co_3O_4 powders. The Co_3O_4 powder without CNTs, did not show any change until 800 °C, at the same TG-DSC analysis conditions with the CNT/ Co_3O_4 nanocomposite (N_2 , 5 °C/min). Over 800 °C, some weight loss with endothermic reaction is observed, which is corresponding to the thermal decomposition reaction of Co_3O_4 to CoO .