

# **Plum-like and Octahedral Co<sub>3</sub>O<sub>4</sub> Single Crystals On and Around Carbon Nanotubes: Large Scale Synthesis and Formation Mechanism**

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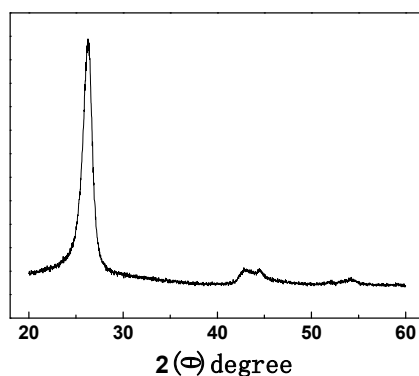
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**Supporting information**

***The XRD pattern of MWCNTs***

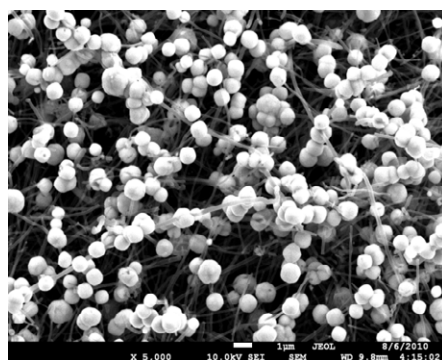
XRD pattern of MWCNTs was displayed in **Figure. S1**. The intense peak at  $2\theta = 26.24$  and broad ones at 42.81, 44.41 and 54.14 correspond to the characteristic [002], [100], [101] and [004] diffractions of CNTs (JCPDS: 65-6212), respectively.



**Figure S1.** XRD patterns of pristine MWCNTs

***FESEM image of  $\text{Co}_3\text{O}_4$  particles grown without adding CTAB***

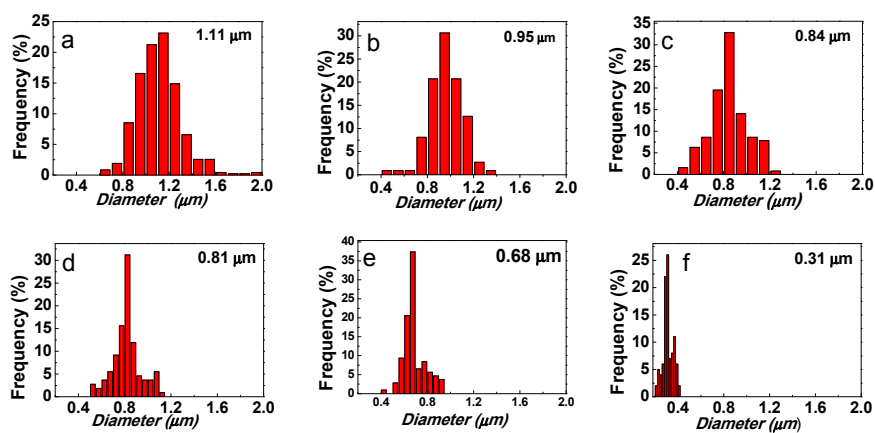
**Figures S2** shows the FESEM image of products obtained in the mixed solvents of EG and water at volume ratio of 1:3 without adding CTAB into the reaction. It can be clearly observed that the necklace-like nanostructures can also be produced. The result indicates that CTAB exhibits no remarkable effect on the growth of  $\text{Co}_3\text{O}_4$  crystals on the surfaces of MWCTNs.



**Figure S2.** FESEM image of  $\text{Co}_3\text{O}_4$ -CNT composites prepared in the reaction without adding CTAB.

### Size distribution profiles of $\text{Co}_3\text{O}_4$ particles

**Figure S3** show the size distribution profiles of  $\text{Co}_3\text{O}_4$  particles on the surfaces of MWCNTs prepared in the mixed solvents of EG and water at different volume ratio.



**Figure S3.** The diameter distribution profiles of  $\text{Co}_3\text{O}_4$  particles on the surfaces of MWCNTs synthesized in the mixed solvents of EG and water at volume ratio of (a) 1:3, (b) 1:4 (c) 1:5, (d) 1:6, (e) 1:8 and (f) 1:10.