Metal coordination polymer derived mesoporous Co_3O_4 nanorods with uniform TiO_2 coating as advanced anodes for lithium ion batteries

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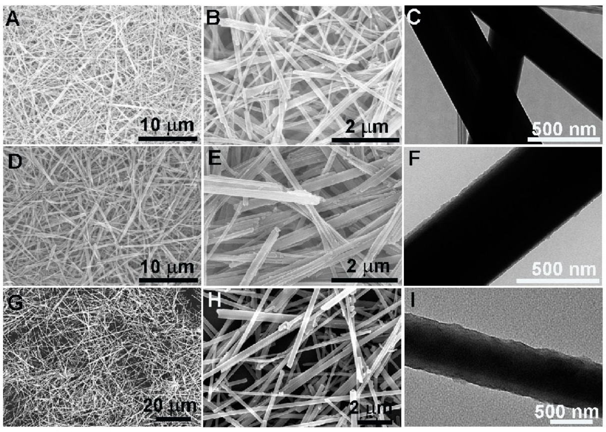

Fig. S1 SEM and TEM images of Co-NA (A-C), Co-NA@PDA (D-F), Co-NA@PDA@TiO_2 (G-I).

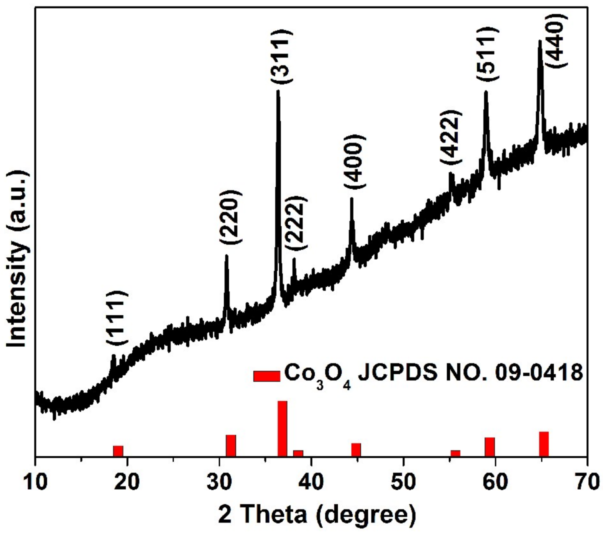

Fig. S2 XRD pattern of the pure Co_3O_4.

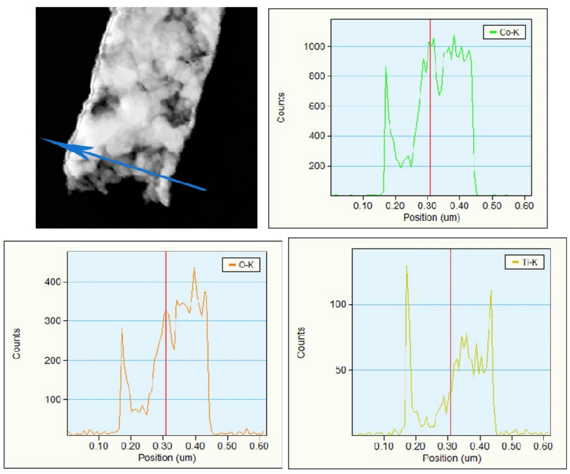

Fig. S3 The SEM image and corresponding EDS line scanning profiles of Co, O and Ti in the $Co_3O_4@TiO_2$ composite.

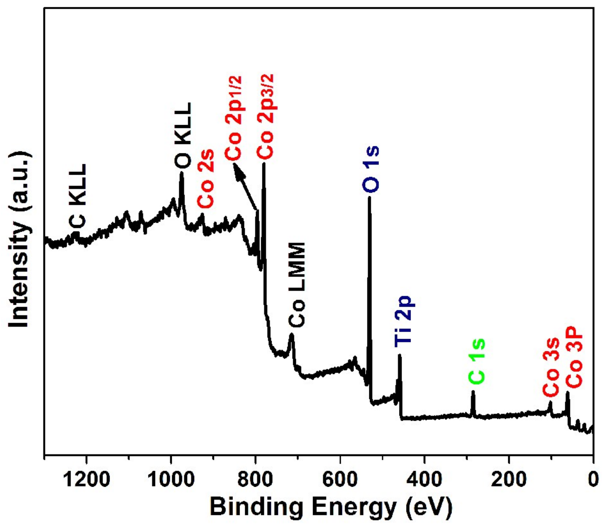

Fig. S4 The XPS survey spectrum of the Co_3O_4@TiO_2 yolk-shell nanorods.

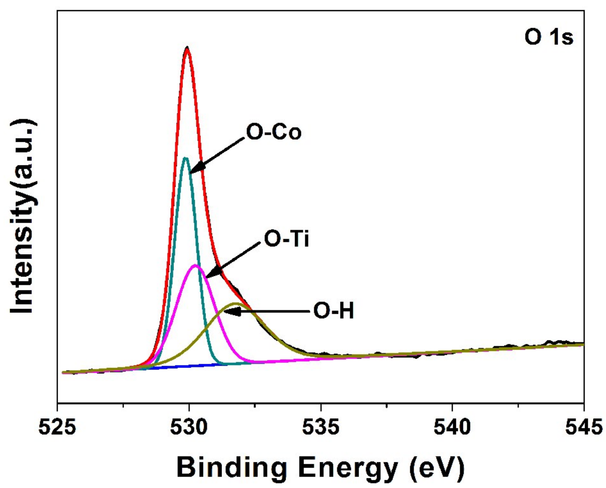

Fig. S5 The XPS high-resolution spectra of the O 1s of the Co_3O_4@TiO_2 yolk-shell nanorods.

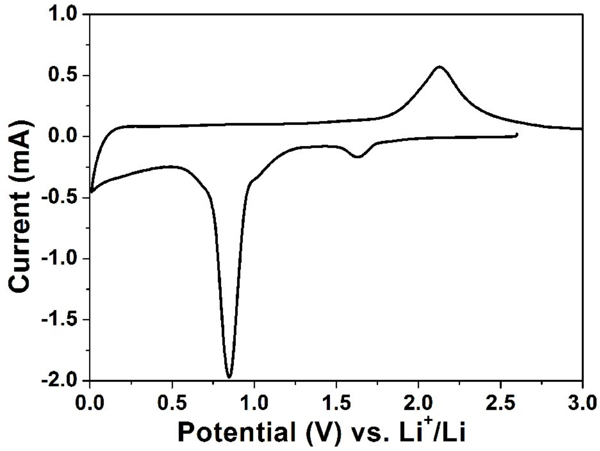

Fig. S6 Cyclic voltammogram (CV) profile of the Co_3O_4@TiO_2 yolk-shell nanorods.

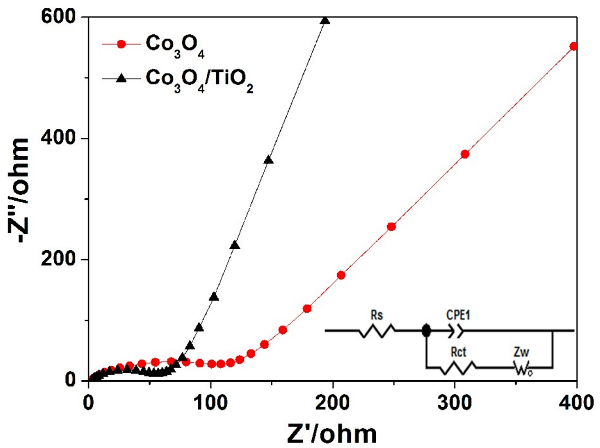

Fig. S7 The electrochemical impedance spectroscopy plots for the Co_3O_4 and the Co_3O_4@TiO_2 electrodes before cycling and the corresponding fitted equivalent circuit model (inset).

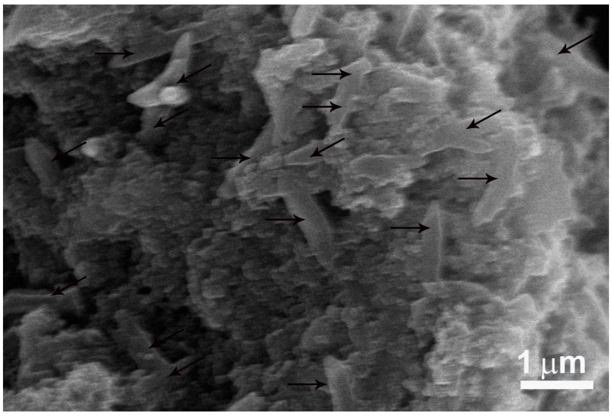

Fig. S8 The SEM images of the Co_3O_4@TiO_2 electrode after 100 cycles at the current density of 200 mA g^{-1}.

Table S1. Comparison of specific capacities of the current Co_3O_4@TiO_2 core-shell electrode with other hybrid electrode materials reported in literature.

Materials	Current density	Cycle number	Specific capacity (mA h g^{-1})	Ref.
Fe_3O_4 nanoparticle-decorated TiO_2 nanofiber	100 mA/g	100	about 454 mA h g^{-1}	1
Graphene wrapped TiO_2@Co_3O_4 nanobelt	100 mA/g	100	about 437 mA h g^{-1}	2
Co_3O_4/TiO_2 hierarchical heterostructures	200 mA/g	100	about 600 mA h g^{-1}	3
CuO@TiO_2 nanocables	60 mA/g	50	about 663 mA h g^{-1}	4
Sandwich-like Co_3O_4/TiO_2	100 mA/g	100	about 800 mA h g^{-1}	5

composite				
Mn_2O_3@TiO_2 cube	100 mA/g	30	about 449 mA h g^{-1}	6
α-Fe_2O_3@SnO_2 nanorattles	200 mA/g	30	about 419 mA h g^{-1}	7
Graphene-based TiO_2/SnO_2 nanosheet	160 mA/g	100	about 600 mA h g^{-1}	8
SnO_2/TiN nanoparticles	78.1 mA/g	50	about 404 mA h g^{-1}	9
Carbon coated TiO_2 nanosheets decorated with Fe_3O_4 nanoparticles	200 mA/g	20	about 742 mA h g^{-1}	10
TiO_2 coated Mn_3O_4 nanorods	200 mA/g	20	about 690 mA h g^{-1}	11
NiO/TiO_2 nanosheets	200 mA/g	100	about 541 mA h g^{-1}	12
Co_3O_4@TiO_2 core-shell nanorods	200 mA/g	100	about 803 mA h g^{-1}	Current study

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