Electronic Supplementary Material (ESI) for RSC Advances

Supplementary Information

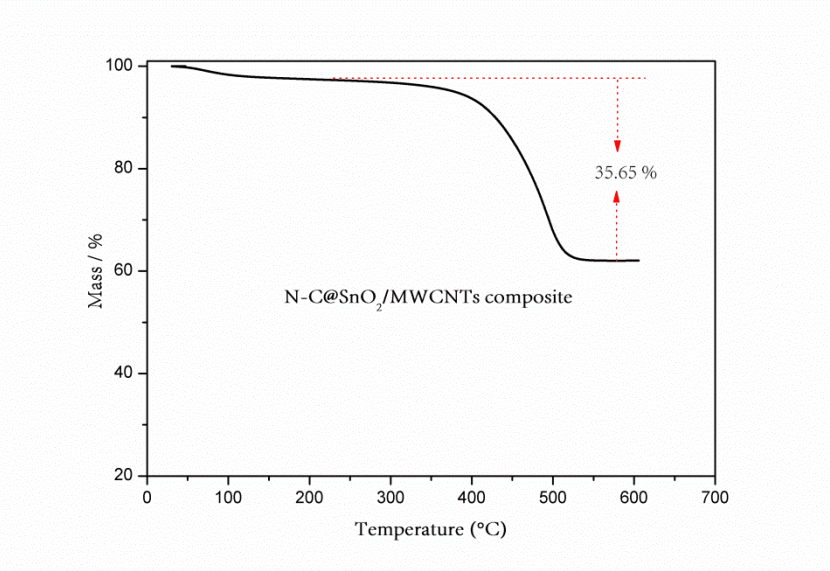
A hybrid nanostructure encapsulating SnO_2 nanoparticles as the anode material for lithium ion batteries with high electrochemical performance

Jing Xie, Juan Yang and Xiangyang Zhou*

School of Metallurgy and Environment, Central South University, Lushan South Road 932, Changsha, China. Fax: +86 731 8871017; Tel: +86 731 88836329; E-mail: hncsyjy308@163.com

1. **Figure**

Figure S1 TGA curve recorded for the N-C@SnO_2/MWCNTs composite under air flow



2. Table

Table S1 Comprehensive electrochemical properties of our composite electrode in comparison with typically outstanding counterparts reported recently

electrodes	Electrochemical performance					Ref.
	Current density (mAh g^{-1})	Initial C[b]	The initial CE[c]	Cycle performance		
				Reversible C	Cycles	
SnO_2@CNT[a]	0.2 mA cm^{-2}	829.5	59.3 %	627.8	50	7
CNT@SnO_2@PPy	150	847	64.4 %	823	100	8
CNT/SnO_2	156	865.8	56 %	420	100	15
SnO_2/Fc@CNT	150	1050	60 %	905	40	16
SnO_2@CNT	400	637	34 %	513	50	17
SnO_2@carbon	100	1216.2	65.6 %	1202.8	200	6
SnO_2/carbon	100	697.4	51.1 %	408.4	50	18
GN[d]/SnO_2	100	1129	74.3 %	825	50	19
SnO_2/GN aerogel	100	902	~43 %	602	60	20
SnO_2/GN	100	unknown	55.9 %	872	200	21
SnO_2/GN	100	931	68 %	718	200	22
N-C@SnO_2/MWCNTs	100	1107.2	80.0 %	757.0	50	This work

[a]CNT is carbon nanotubes, [b]C is the specific capacity / mAh g^{-1}, [c]CE is the coulombic efficiency, [d]GN is the graphene

Table S2 Electrode resistance obtained from the equivalent circuit fitting of experimental data

Sample	Cycle	R_o (Ω)	R_s (Ω)	R_{ct} (Ω)
SnO_2	1st	5.34	11.44	39.50
	15th	14.75	33.36	83.75
N-C@SnO_2 /MWCNTs	1st	5.83	4.66	12.77
	15th	6.92	6.85	49.72