Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Rational Design and Preparation of Few-layered $MoSe_2$ Nanosheets@C/TiO_2 Nanobelts Heterostructures with Superior Lithium Storage Performance

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Table S1 A table for list of electrochemical properties of $MoSe_2$ and its hybrid composites

Electrode description	Initial discharge specific capacity	Initial Coulombic effeciency	Cycling stability	Rate performance
This work	1153.3 mAh g^{-1} at 500 mA g^{-1}	74.4 %	987.4 mAh g^{-1} after 100 cycles at 500 mA g^{-1}	920, 906, 874, and 860 mAh g^{-1} at 500, 1000, 2000, and 3000 mA g^{-1}
Mesoporous $MoSe_2$[1]	759 mAh g^{-1} at 21.1 mA g^{-1}	79.2%	630 mAh g^{-1} after 35 cycles at 21.1 mA g^{-1}	646, 604, 593, 557, 499, and 372 mAh g^{-1} at 21.1, 42.2, 84.4, 211, 422, and 844 mA g^{-1}
Nanocrystalline $MoSe_2$[2]	782 mAh g^{-1} at 42.2 mA g^{-1}	76.7%	405 mAh g^{-1} after 50 cycles at 42.2 mA g^{-1}	600, 550, 450, 370, and 322 mAh g^{-1} at 42.2, 84.4, 211, 422, and 4220 mA g^{-1}
$MoSe_2$@porous hollow carbon spheres[3]	1321 mAh g^{-1} at 200 mA g^{-1}	57.4 %,	681 mAh g^{-1} after 100 cycles at 200 mA g^{-1}	820, 760, 680, and 640 mAh g^{-1} at 500, 1000, 2000, 3000 mA g^{-1}
Sheet-like $MoSe_2$/C[4]	821.7 mAh g^{-1} at 100 mA g^{-1}	72.3%	576.7 mAh g^{-1} after 50 cycles at 100 mA g^{-1}	540 and 450 mAh g^{-1} at 1000 and 2000 mA g^{-1}
$MoSe_2$ nanosheets/rGO[5]	1060 mAh g^{-1} at 500 mA g^{-1}	67%	917 and 750 mAh g^{-1} after 100 cycles at 500 and 1000 mA g^{-1}, respectively.	
Yolk-shell-structured $MoSe_2$ microspheres[6]	527 mAh g^{-1} at 200 mA g^{-1}	85%	433 mAh g^{-1} after 50 cycles at 200 mA g^{-1}	442, 399, 382, 369, 364, and 345 mAh g^{-1} at 100, 300, 500, 800, 1000 and 1500 mA g^{-1}
$MoSe_2$ nanoplates[7]	513 mAh g^{-1} at 42.2 mA g^{-1}	85.7%	369 mAh g^{-1} after 50 cycles at 42.2 mA g^{-1}	440 and 250 mAh g^{-1} at 42.2 and 4228 mA g^{-1}
$MoSe_2$/carbon fibre[8]	887.9 mAh g^{-1} at 200 mA g^{-1}		390.7 mAh g^{-1} after 100 cycles at 200 mA g^{-1}	462.1, 362.2, 294.2, 239.7 and 161.9 mAh g^{-1} at 200, 500, 1000, 2000 and 5000 mA g^{-1}
S-doped $MoSe_2$ nanotubes[9]	1316 mAh g^{-1} at 100 mA g^{-1}		947 mAh g^{-1} after 30 cycles at 100 mA g^{-1}	1054, 1020, 982, and 667 mAh g^{-1} at 50, 100, 200 and 500 mA g^{-1}

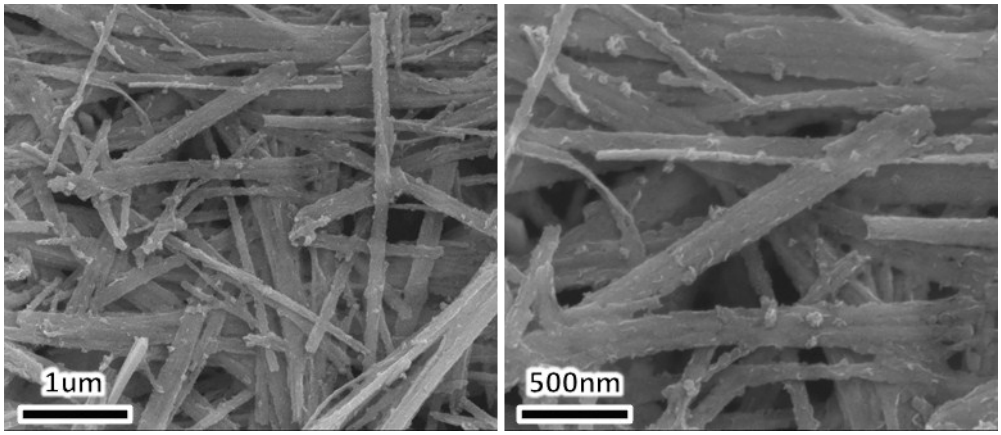

Fig.S1 SEM images of $MoSe_2/TiO_2$ without the addition of glucose

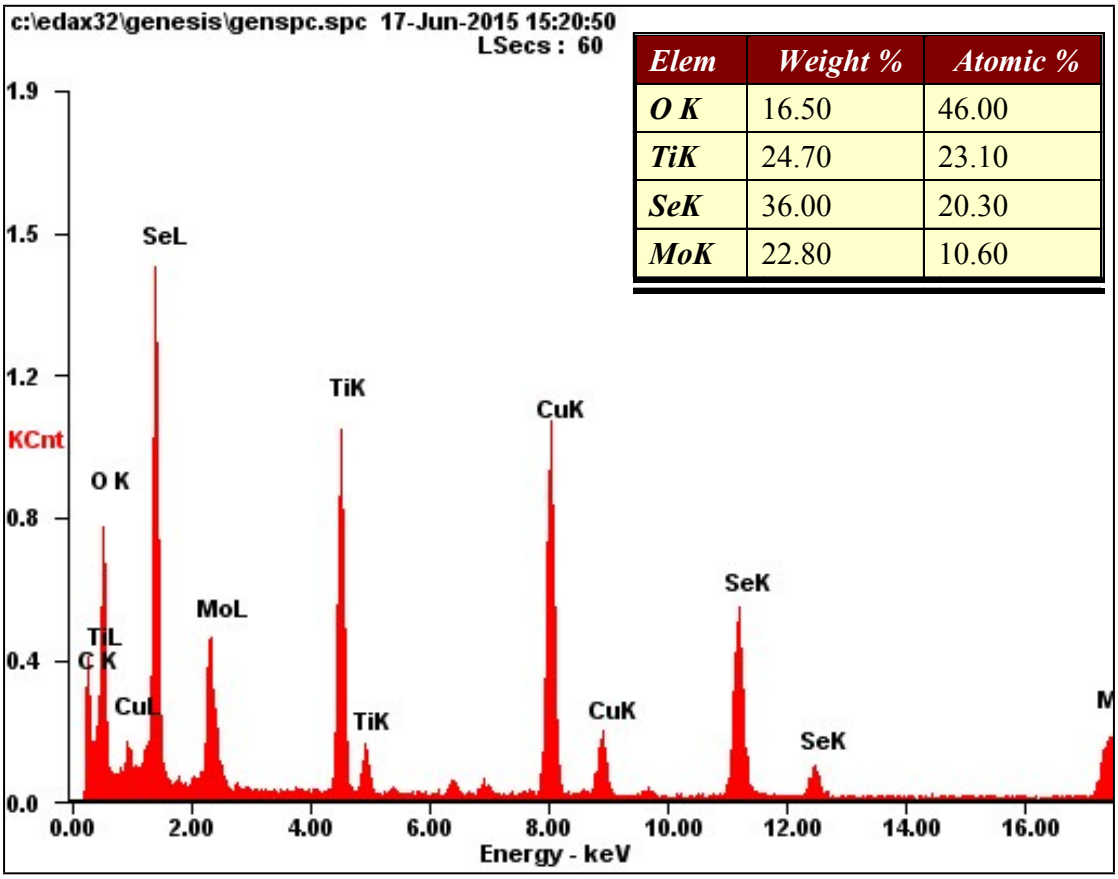

Fig.S2 EDX of $MoSe_2$@C/TiO_2 heterostructures

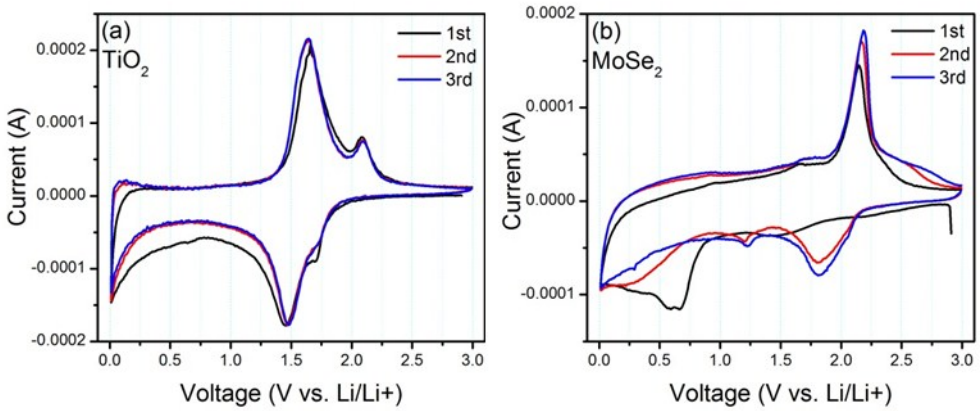

Fig.S3 CV profiles of pure $MoSe_2$ nanosheets and bare TiO_2 nanobelts

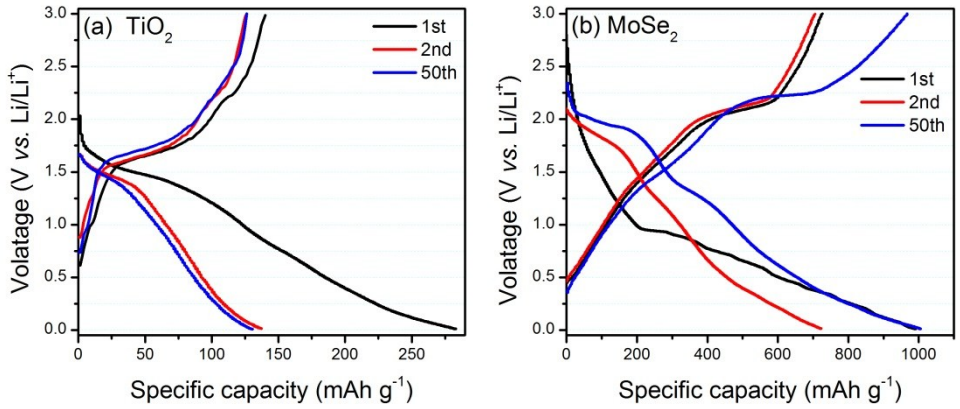

Fig.S4 Discharge-charge voltage profiles of pure $MoSe_2$ nanosheets and bare TiO_2 nanobelts

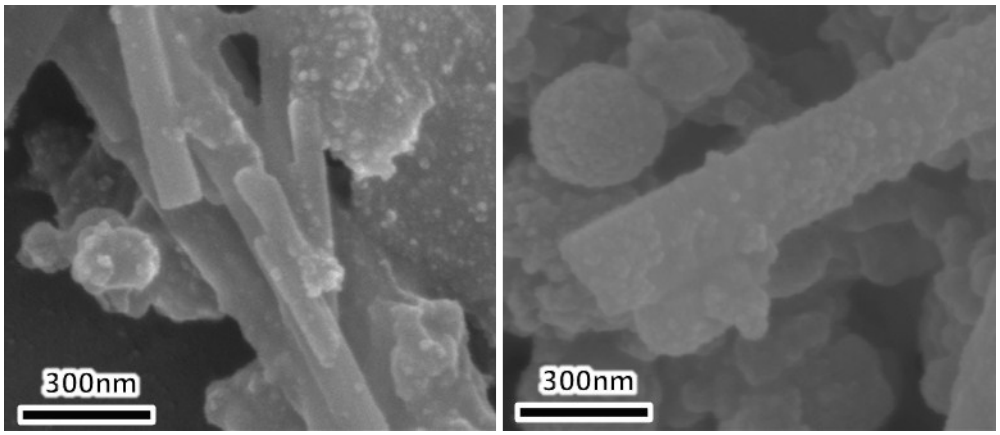

Fig.S5 SEM images (Fig.S5) of $MoSe_2$@C/TiO_2 heterostructures electrodes after cycling for 100 cycles

References for Supporting Information

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