Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Synthesis of chemically reduced graphene oxide (RGO)

Graphene oxide (GO) preparation started by exfoliating expandable graphite powder (100 mesh) using a modified Hummers' method at 1000°C in forming gas for 60 s. In a typical reaction, 1.0 g graphite, 0.5 g $NaNO_3$, and 23 ml H_2SO_4 were stirred together in an ice bath until homogenized. After 3 g $KMnO_4$ was slowly added to the solution while stirring, the solution was transferred to a 40^oC water bath, stirred for about 2 h to form a thick paste. 100 ml water was added and stirred for 1 h, and then 2 ml H_2O_2 (30 wt. % aqueous solution) was added and stirred for 2 h. Inorganic anions and other impurities were removed through 15 washing cycles that included centrifugation, discarding supernatant liquid, and resuspending the solid in an aqueous mixture using stirring and ultrasonication. After drying, the loose and brown GO powder was obtained.

Chemical and high-temperatue annealing reduction procedure was used to reduce GO to obtain RGO. In the chemical reduction procedure, 100 mg GO was dispersed directly into a hydrazine monohydrate solution (100 ml, 80 wt.%), and stirred at 60^oC for 48 h. In the high-temperature annealing reduction procedure, 100 mg GO was directly placed in the centre of quartz tube, which was heated to 400°C for 2h under 200 sccm Ar and 10 sccm H_2 gas flow.

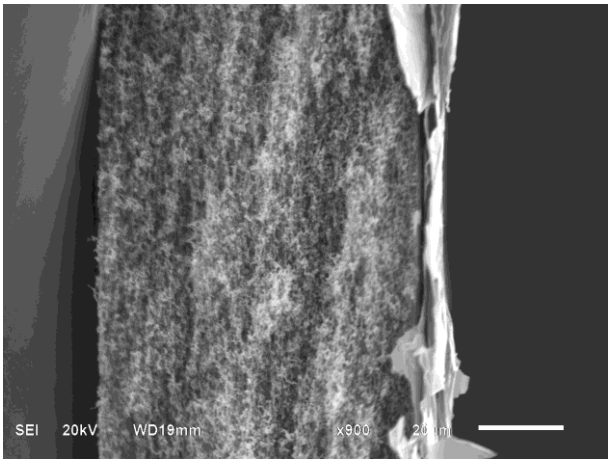

Figure S1. Cross-sectional image of graphene paper.

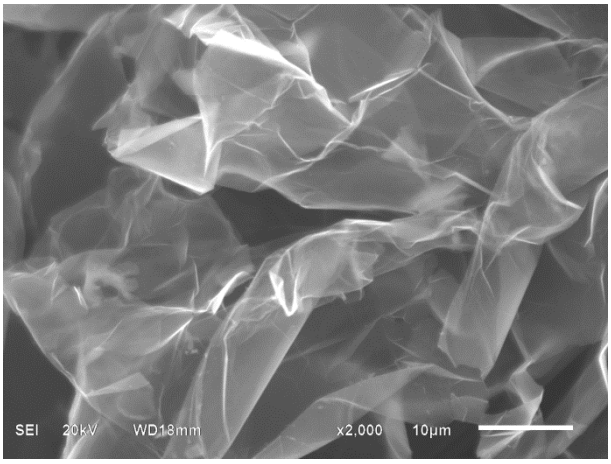

Figure S2. Low-magnification SEM images of graphene.

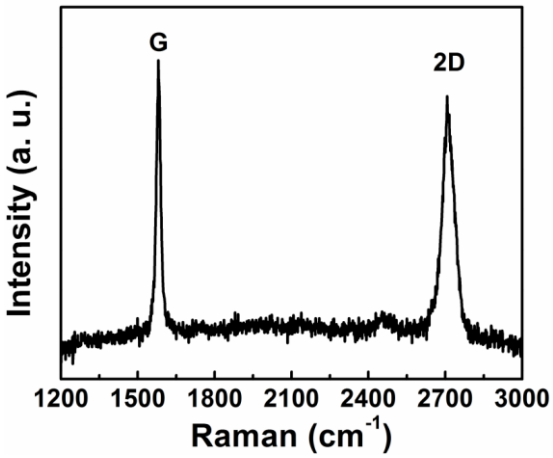

Figure S3. Raman spectrum of CVD graphene sheets.

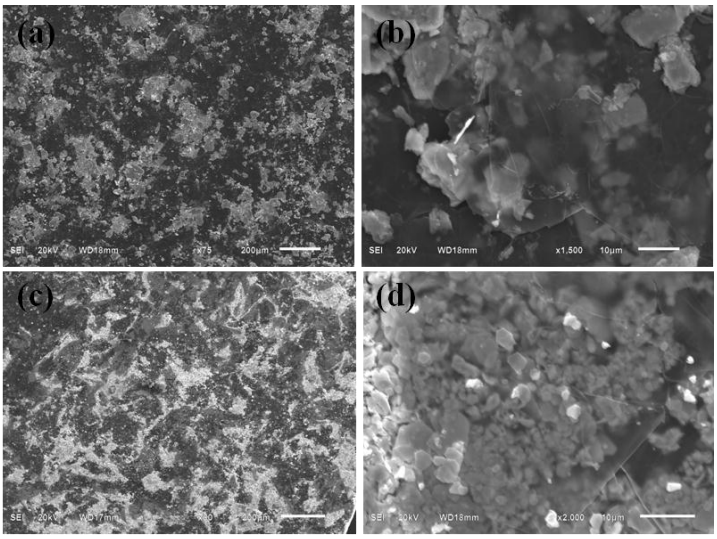

Figure S4. Low- and high-magnification SEM images of (a, b) MoS_2/graphene and (c, d) WS_2/graphene papers.

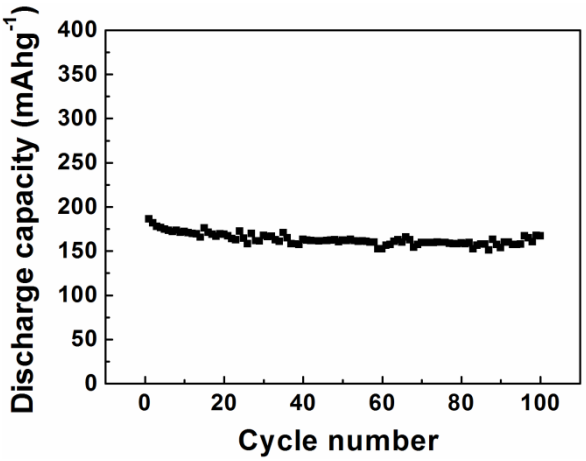

Figure S5. Cycle performance of CVD graphene paper at a current density of 500 mA g^{-1} as a lithium ion battery anode.