Electronic Supplementary Material (ESI) for Nanoscale Advances.

Heterostructure of two different 2D materials based on MoS_2 nanoflowers@rGO: an electrode material for sodium-ion capacitor

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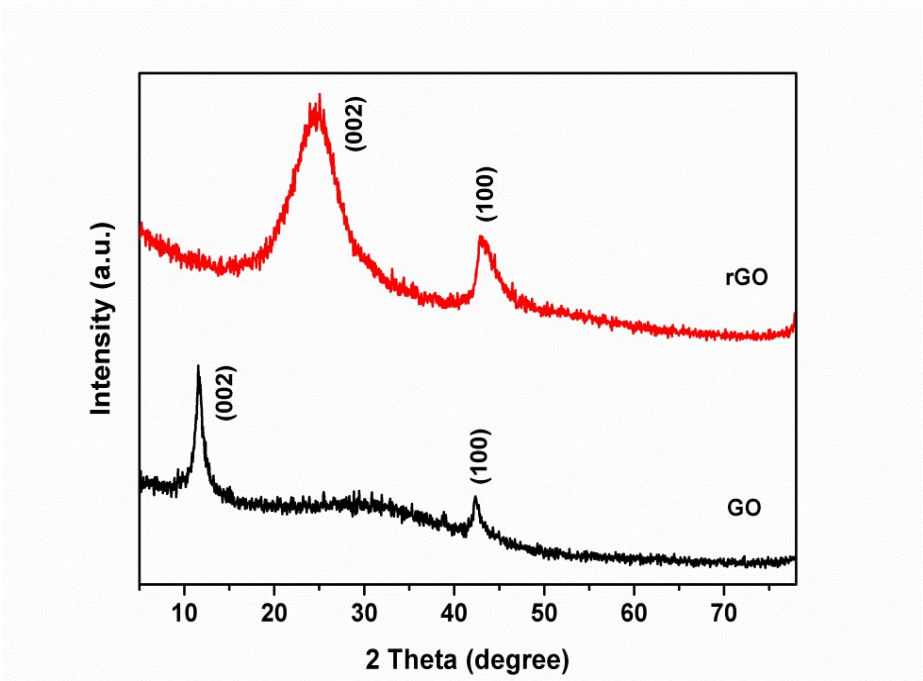

Fig. S1 XRD pattern of GO and rGO

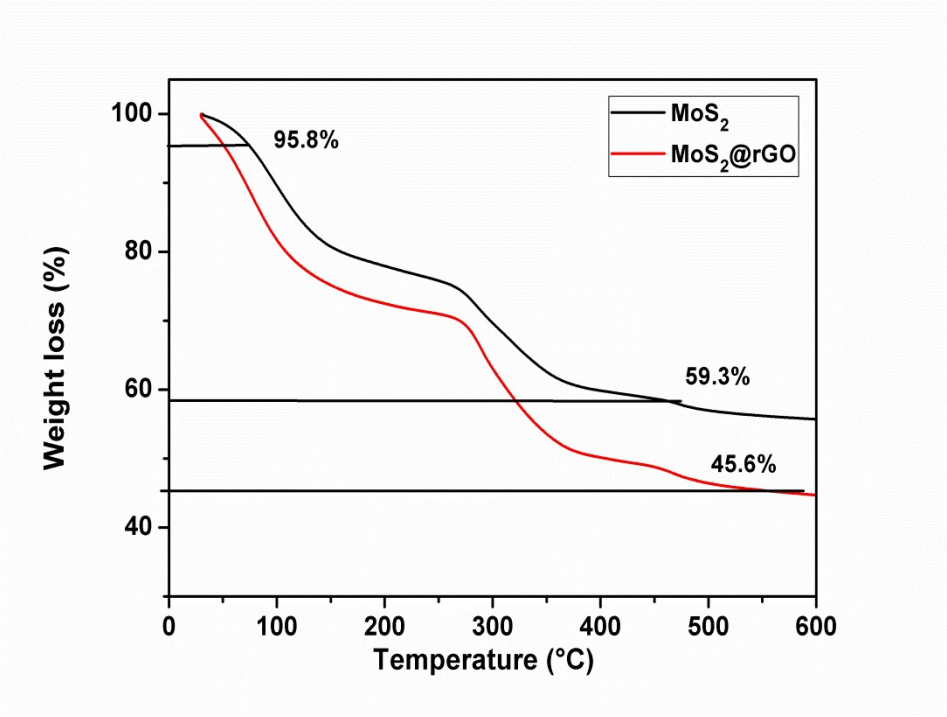

Fig. S2 TG curve of MoS_2 and MoS_2@rGO composite

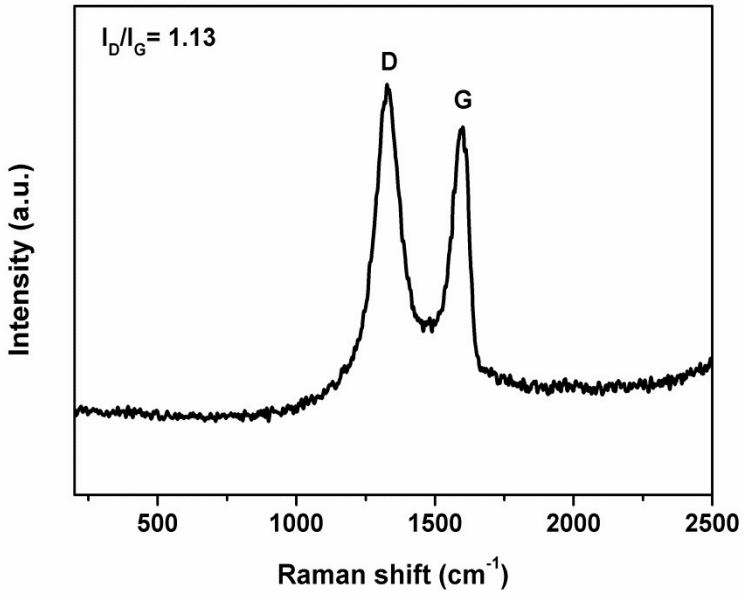

Fig. S3 Raman spectrum of rGO

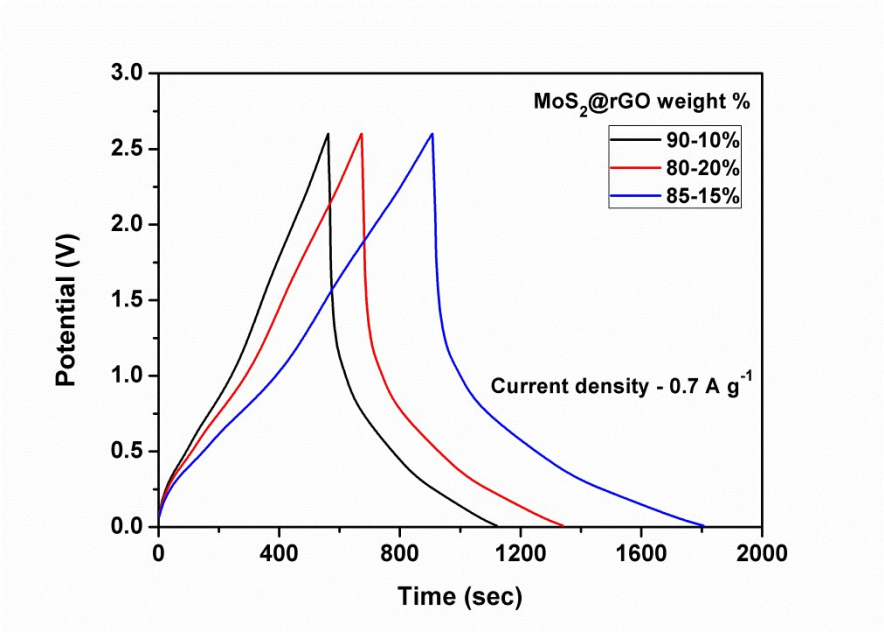

Fig. S4 Galvanostatic charge-discharge curves of MoS_2@rGO composites with different weight percentage

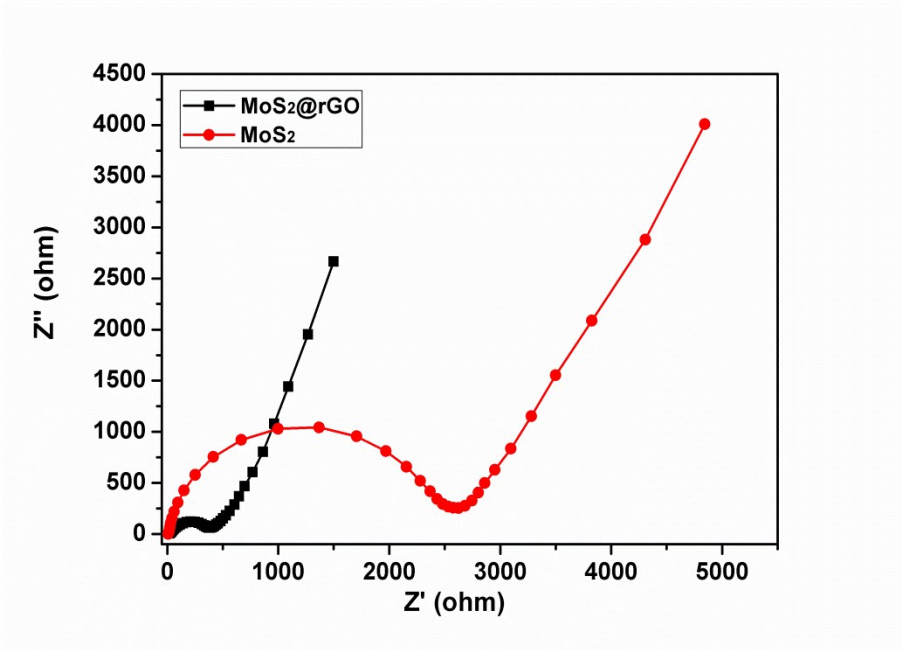

Fig. S5 Nquist plot of MoS_2 and MoS_2@rGO composite

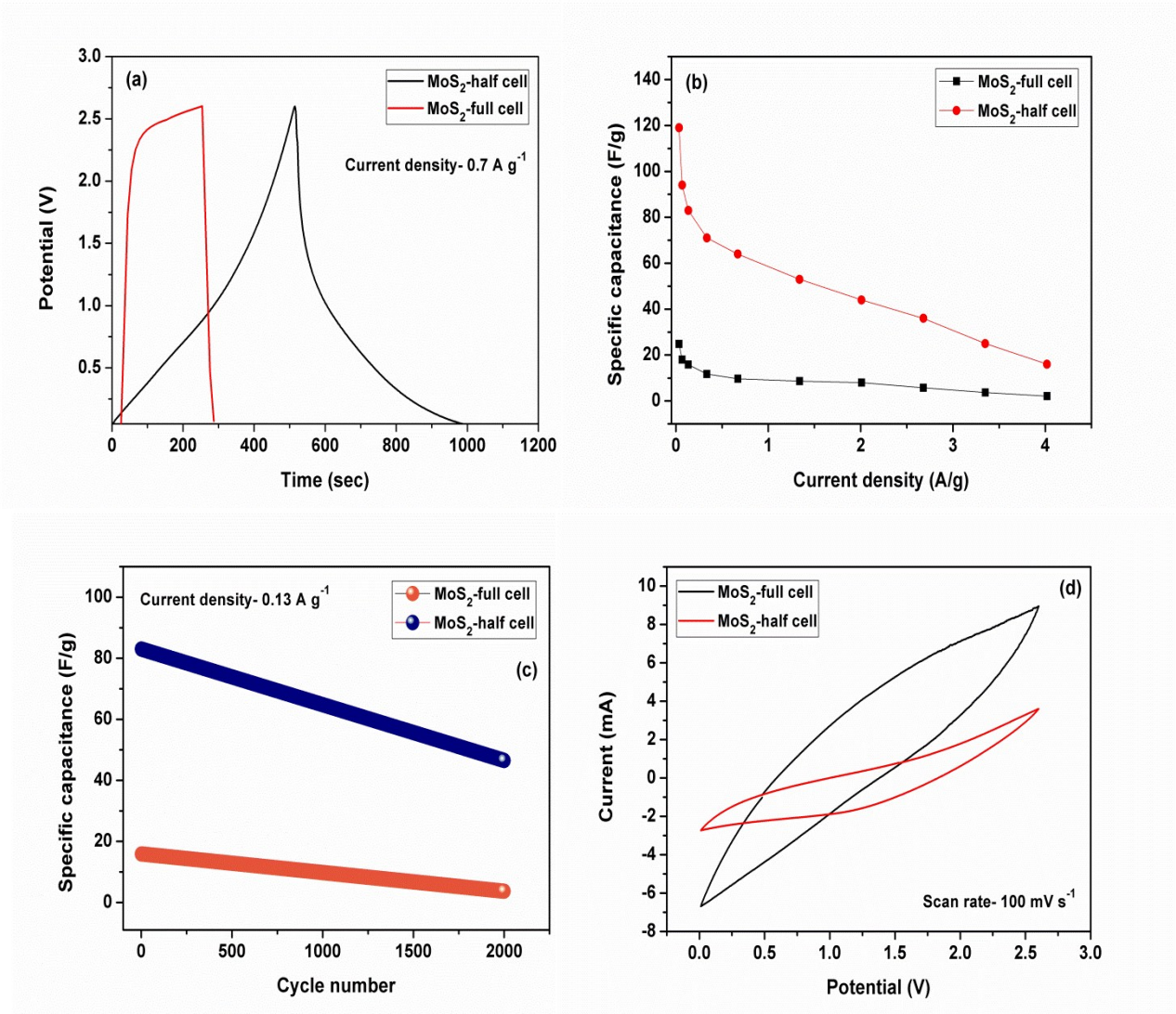

Fig. S6 Electrochemical performance of pristine MoS_2 *vs* Na/Na^+ (half cell & full cell). (a) Galvanostatic charge-discharge curves (b) Specific capacitances at different current densities (c) Cycling stability (d) Cyclic voltammograms at different scan rate

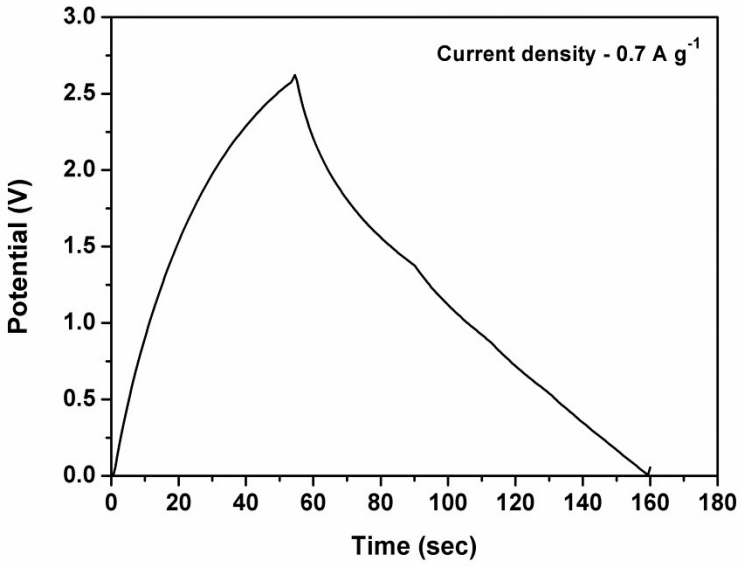

Fig. S7 Galvanostatic charge-discharge curve of rGO (full cell)

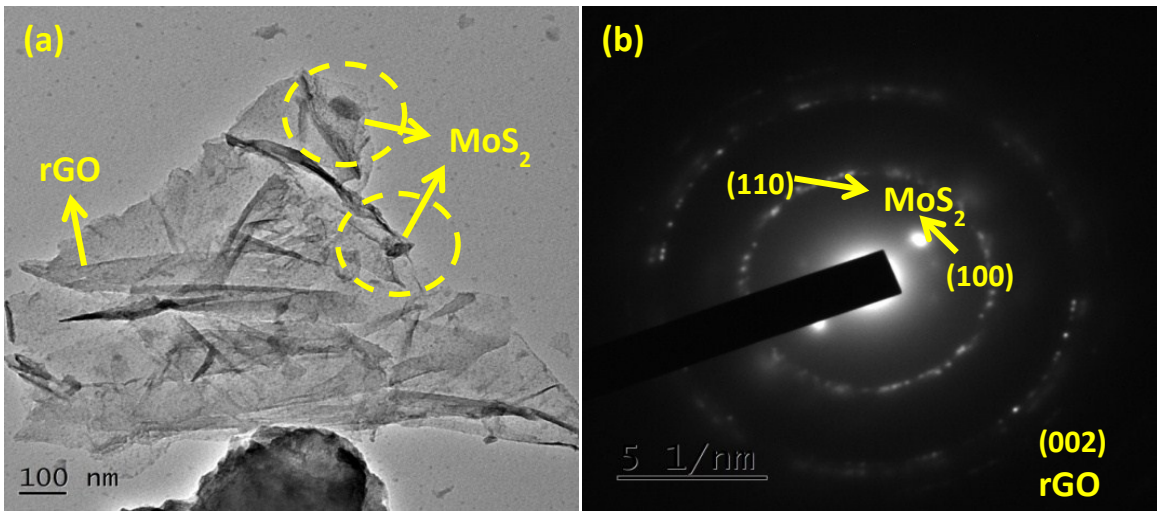

Fig. S8 (a) HRTEM image and (b) SAED pattern of MoS_2@rGO composite electrode after 2000 cycles

Table. S1 Comparison of specific capacitance of MoS_2 based electrode materials for super capacitor application in aqueous and non-aqueous electrolytes

S.No	Material	Method	Electrolyte	Scan rate/ Current density	Specific capacitance (Fg^{-1})	Reference
1.	MoS_2	CBD	0.5 M Na_2SO_4	5 mVs^{-1}	576	37
2.	MoS_2	Hydrothermal	1 M Na_2SO_4 1 M KCl	1 mVs^{-1} 1 mVs^{-1}	376 403	38
3.	MoS_2	Hydrothermal	1 M Na_2SO_4	5 mVs^{-1}	122	39
4.	MoS_2	CVD	0.5 M H_2SO_4	1 mVs^{-1}	100	40
5.	MoS_2/graphene composite	Hydrothermal	1 M $NaClO_4$ (in PC+FEC)	1.5 C (C rate)	50 (full cell)	28
6.	MoS_2	Solid-gas reaction method	1 M $NaClO_4$ (in PC)	1 mVs^{-1}	118 $mAhg^{-1}$ specific capacity, (half cell)	27
7.	MoS_2@rGO composite	Hydrothermal	0.75 M $NaPF_6$ (in EC+DEC)	0.03 Ag^{-1}	226, (half cell) 55 (full cell)	Present work