Supplementary information

Electrochemical performance of self-assembled two-dimensional heterostructure of rGO/MoS_2/h-BN

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1. XRD pattern reduced Graphene oxide (rGO)

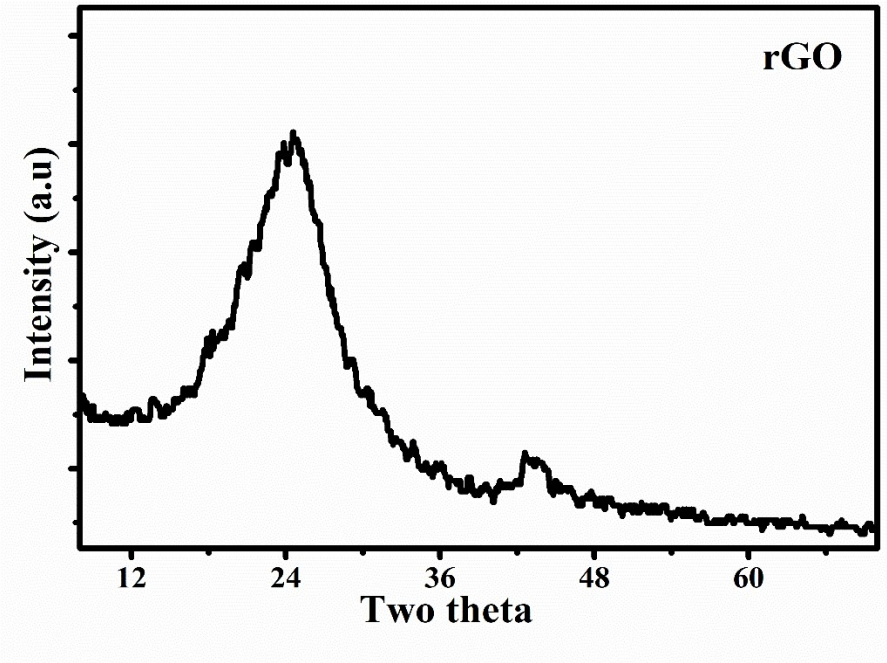

Figure S1: X-ray diffraction pattern of rGO

Figure S1 two well-resolved diffraction patterns for rGO ~ 24.6 ° (0 0 2) and 43.3° (1 0 2) are shown with respective planes. The d spacing calculated is 0.73nm. The broad peak in

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these samples correspond to few layers of rGO sheets in the particles. One small peak at 43.3 indicating the presence of multilayer domains along with few mono-layered rGO sheets.

2. XRD pattern of hexagonal boron nitride (h-BN)

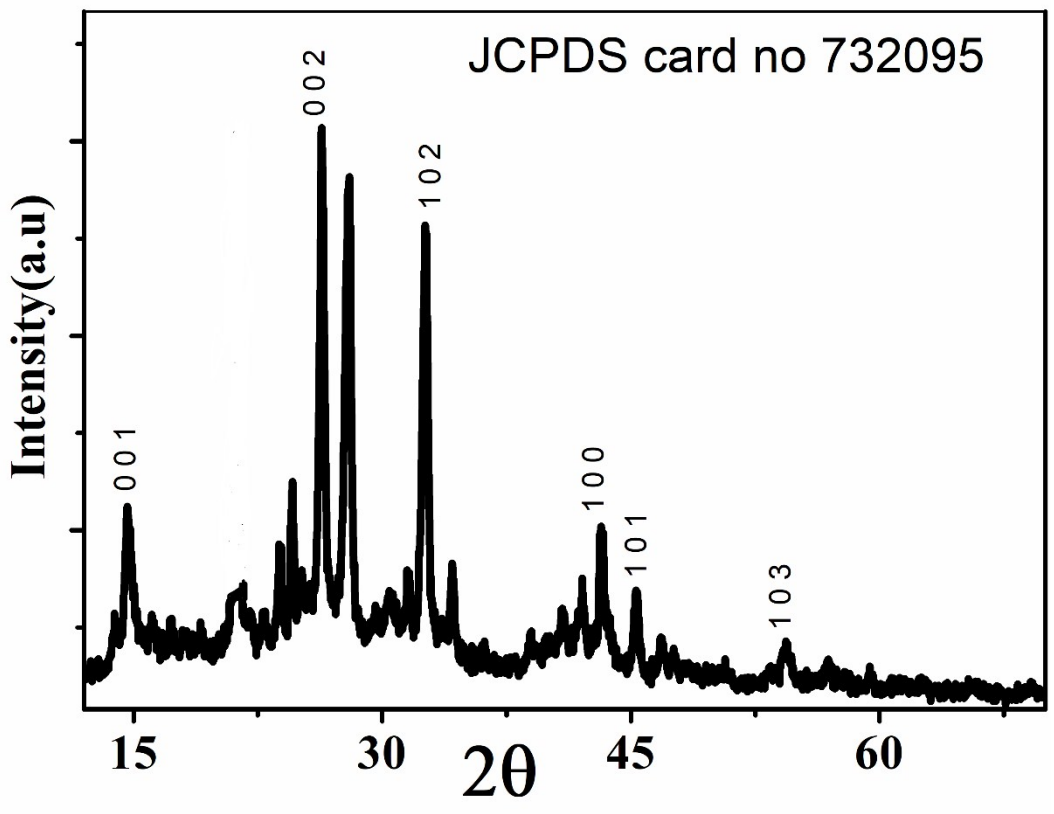

Figure S2: XRD pattern of h-BN.

All reflections can be indexed to hexagonal form boron nitride. The most intense peak at 2θ value 27 is due to the (002) plane of hexagonal boron nitride. The d spacing calculated is 0.33nm with respect to this plane. While the second most intense peak at 2θ values 13 is due to the (001) plane. The other peaks ~21 and 28 assigned for residual B_2O_3 and are not observed in case of composite.

3. XRD pattern of hexagonal boron nitride MoS_2

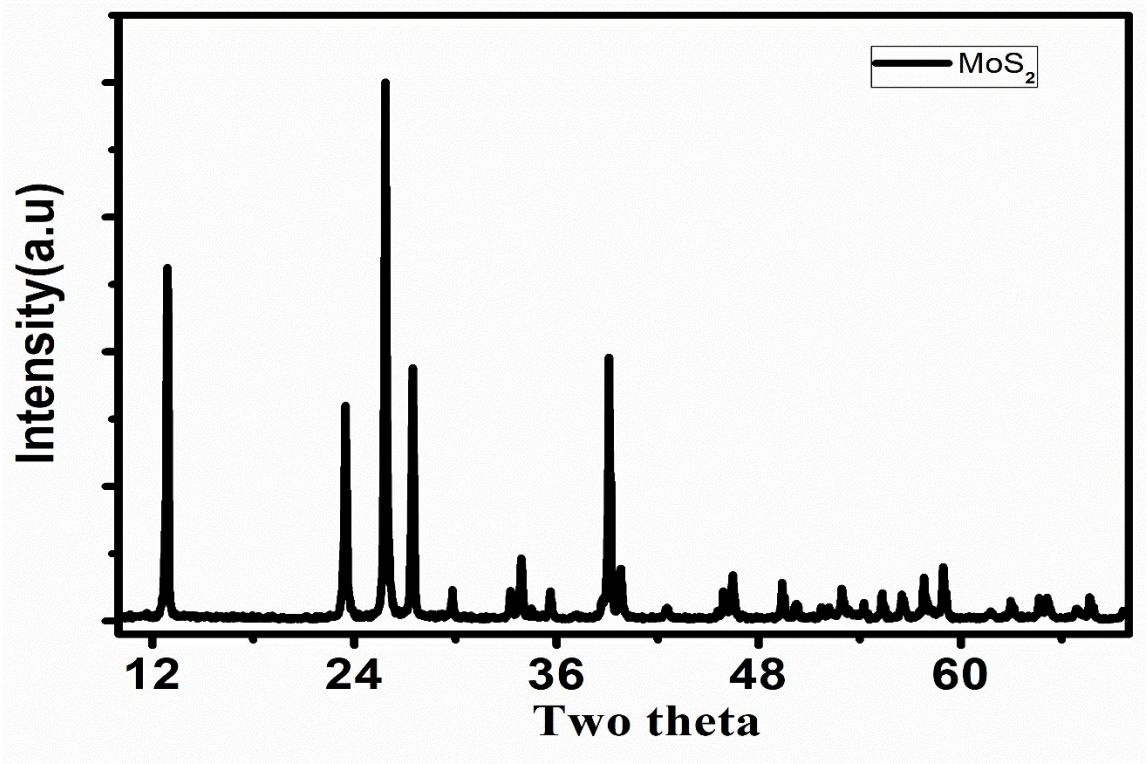

Figure S3: X-ray diffraction pattern of MoS_2

XRD patterns of MoS_2 is shown in Fig. S3. The 2θ at 14.4°, 25.8° ,39.13°, 59° corresponding to (002), (100), (103), (1 0 5) and (1 1 0) of the 2H-MoS_2 (JCPDS card No. 37-1492) respectively. It signifies the presence of MoS_2 and the resemblances separated MoS_2 layers. The interlayer space is calculated to be 0.11 nm according to the 2θ=14.4 (0 0 2 plane) of MoS_2. The peak at 2θ ~ 27.5 ° is correspond to MoO_3.