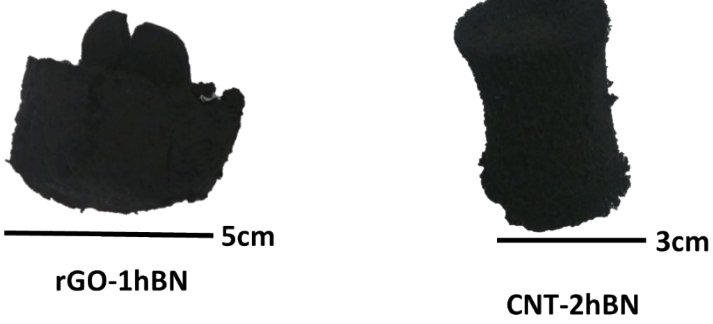
Supporting Information

GO:AB	1:0.25	1:0.5	1:1	1:2	1:4
CNTs:AB	1:0.25	1:0.5	1:1	1:2	1:4



rGO-1hBN CNT-2hBN

Density Calculation:

The density of rGO-1hBN and CNTs-2hBN were calculated using the following formula for cylinder shape.

$$\rho = \frac{m}{\pi r^2 h}$$

Where, ρ is the density, m is the mass, r is the radius and h is the height.

rGO-1hBN

ρ=158mg/(π*2.5^{2}cm*2.3cm)=3.49mg/cm^3

CNT-2hBN

ρ=182mg/(π*1.5^{2}cm*5.2cm)=4.95mg/cm^3

Figure S1. The ratio of CNS and Ammonia borane (AB) for fabrication of CNS-hBN heterostructures and 3D porous structure of rGO-1hBN and CNTs-2hBN.

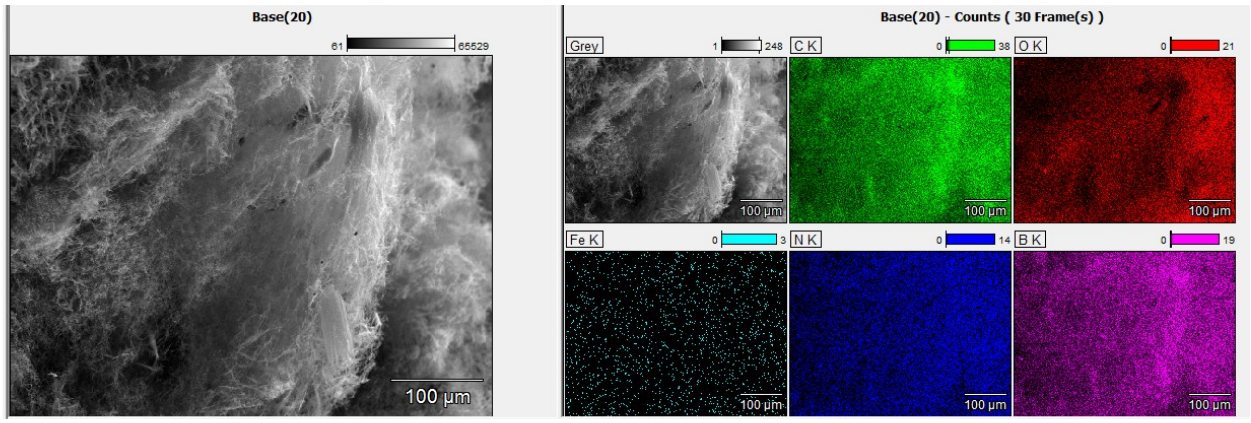


Figure S2. EDAX characterization of CNTs-BN structures that shows homogenous distribution of hBN.

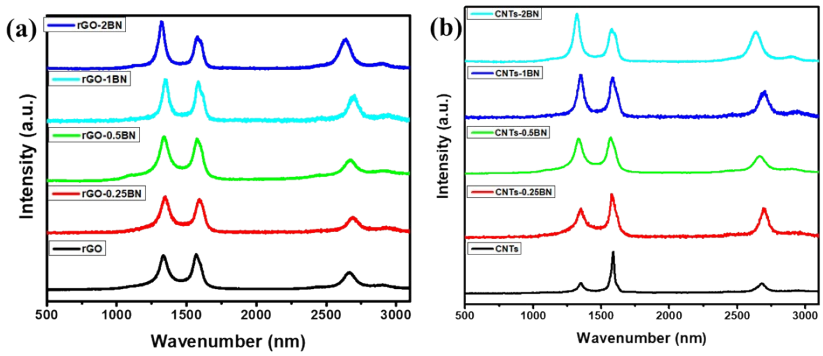


Figure S3. Raman spectra of all ratio of CNS-BN structures.

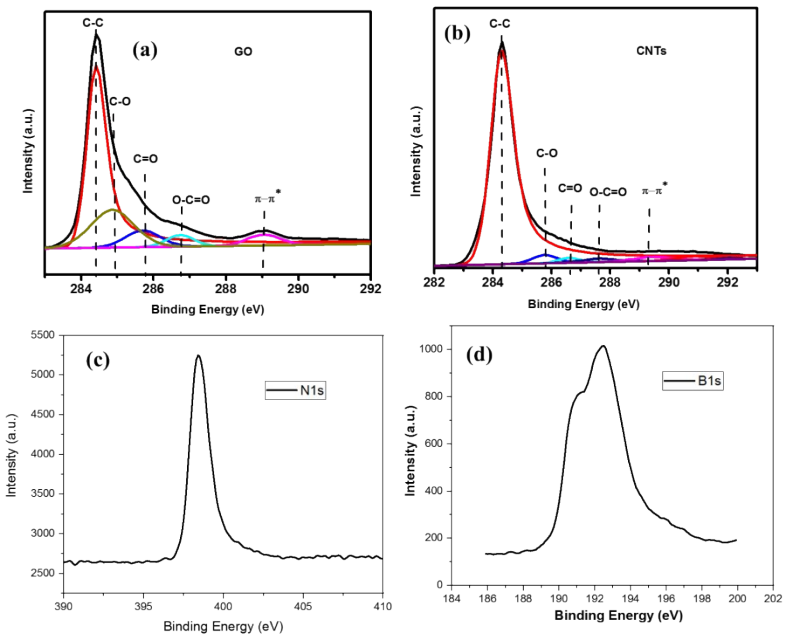


Figure S4. XPS spectra of (a) GO and (b) CNTs, (c-d) binding energies of N1s and B1s

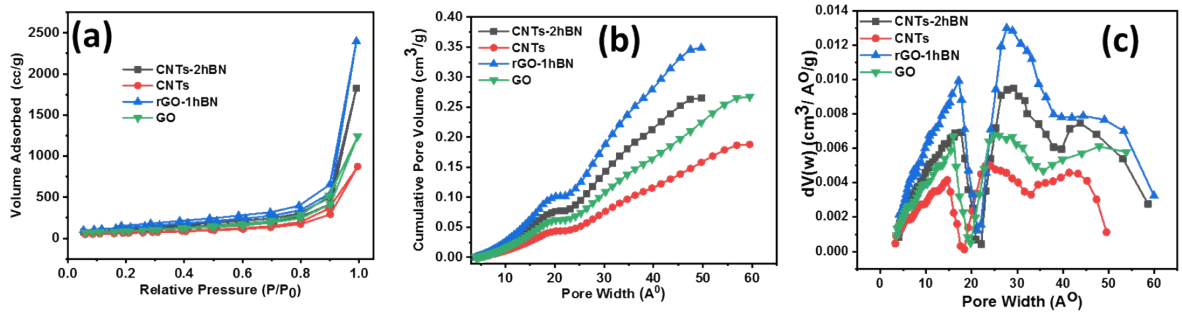


Figure S5. BET surface area analysis of CNTs, CNTs-2hBN, GO and rGO-1hBN (a) The N_2 absorption isotherm of pristine (b) Cumulative pore volume as a function of pore size, (c) DFT method pore size distribution.

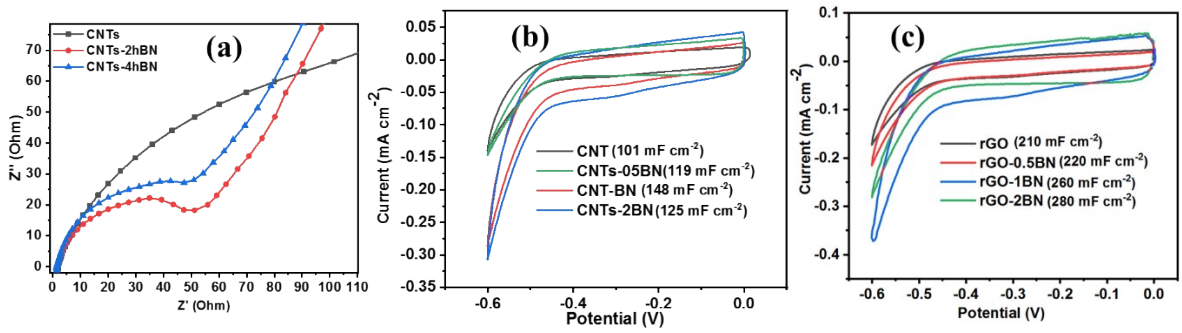


Figure S6. (a) Nyquist plots of EIS of CNTs, CNTs-2hBN and CNTs-4hBN, (b) CV curves of (b) CNTs and CNTs-hBN and (c) rGO and rGO-hBN structures.

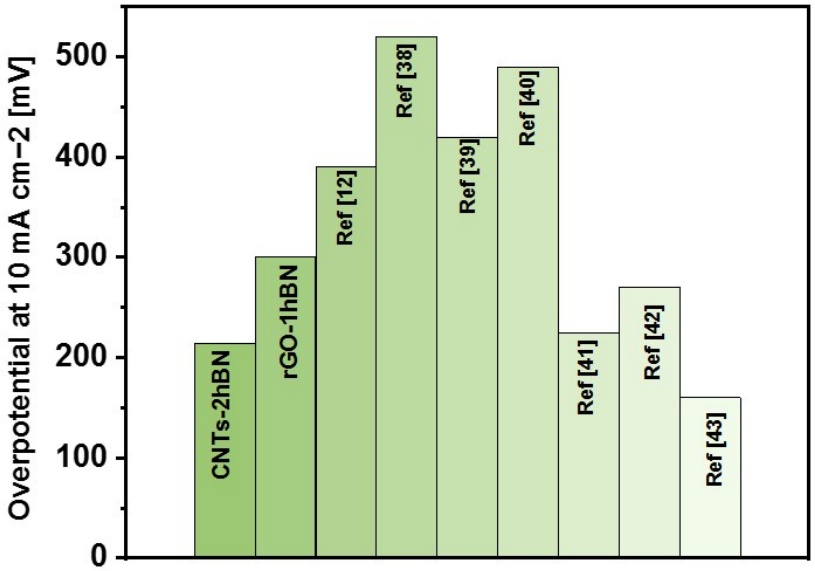


Figure S7. The comparison of HER performance of CNTs-2hBN and rGO-1hBN with some catalysis reported in the literature.

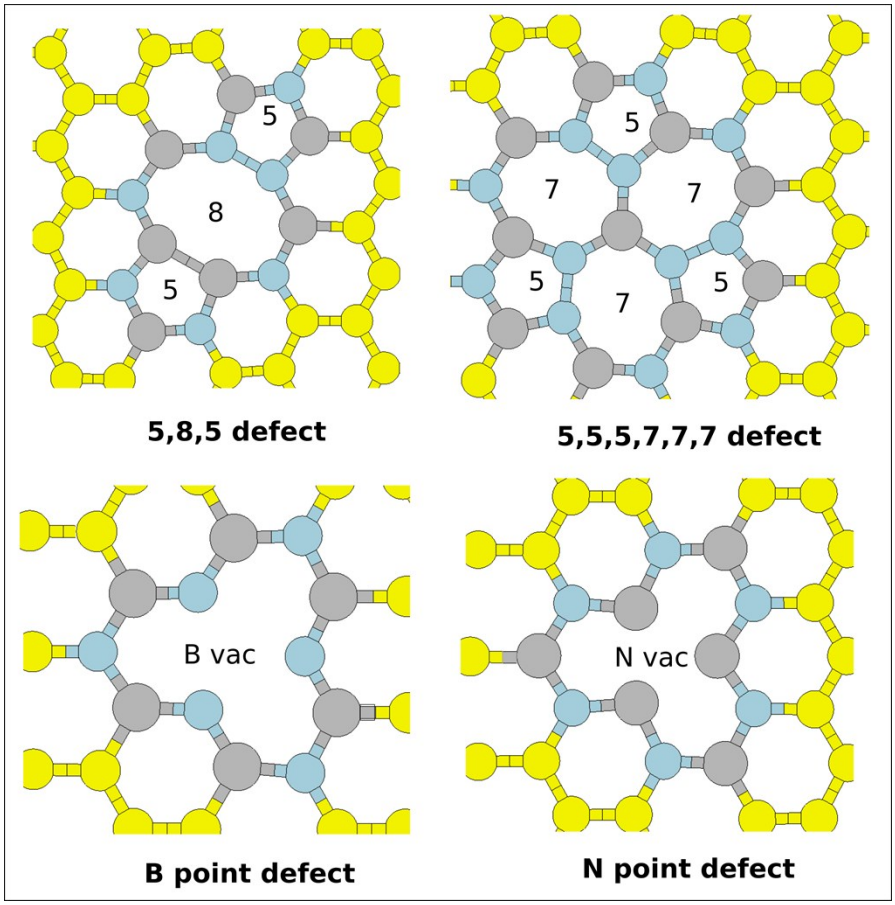


Figure S8: Defected structures of BN doped graphene, referred to in figure 5.