

## Supplementary Information (SI†)

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### **In-situ grown nickel selenide onto graphene nanohybrid electrodes for high energy density asymmetric supercapacitors**

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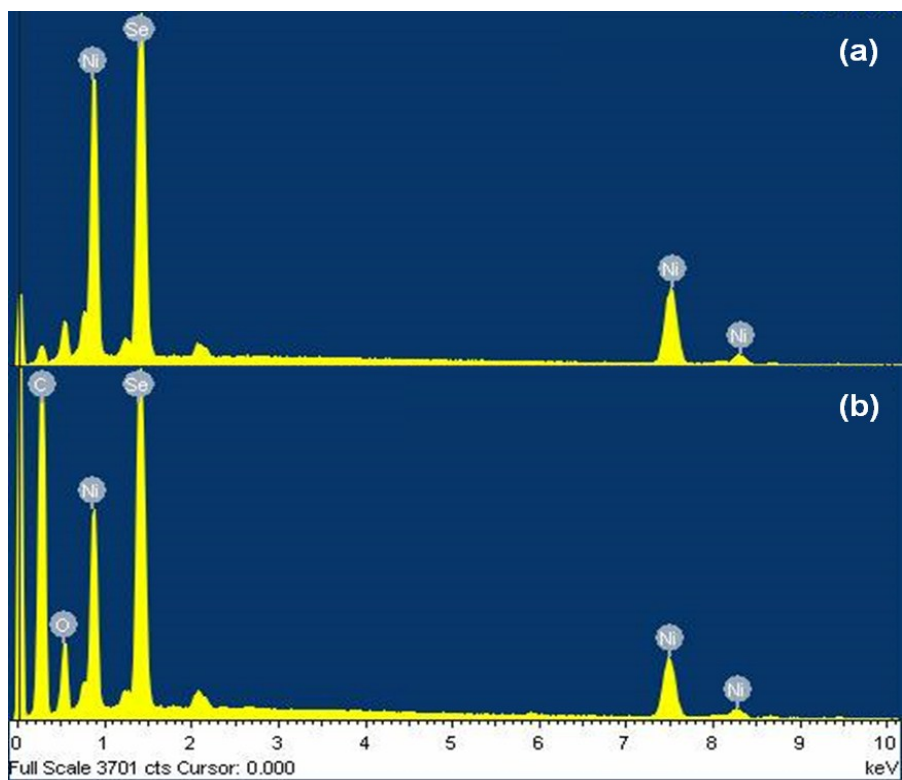
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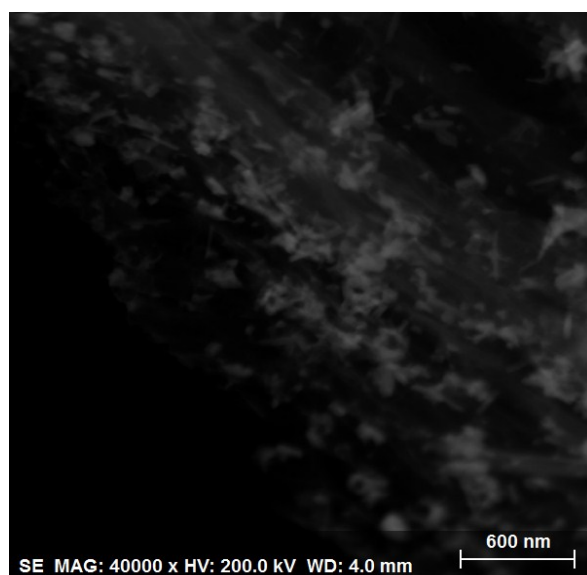
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**Fig. S1** EDX of (a) NiSe nanoparticles and (b) NiSe-G nanohybrid.



**Fig. S2** Area of study for elemental mapping by TEM.

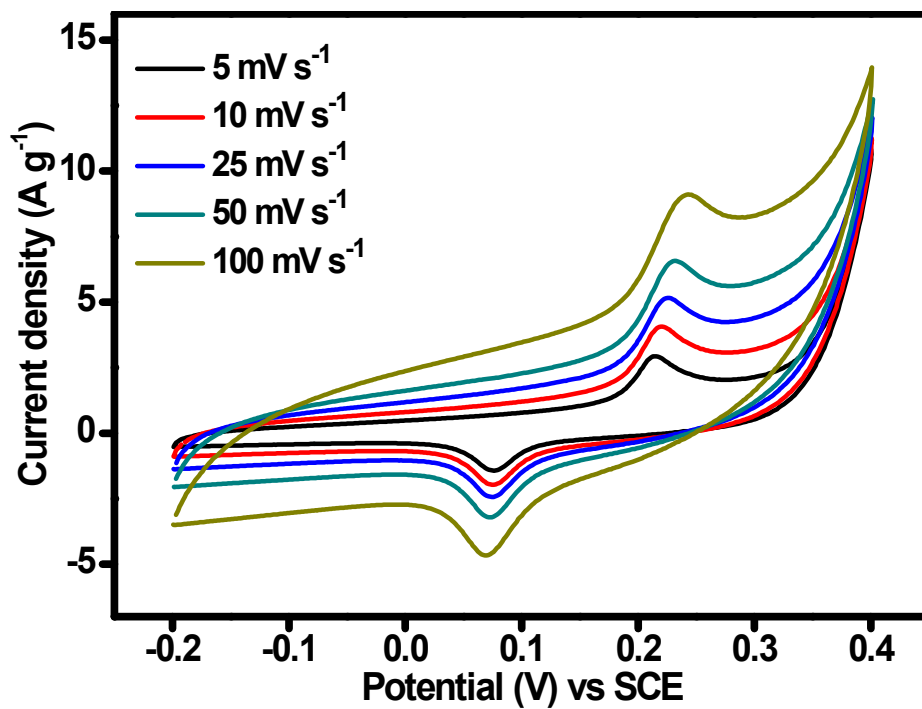


Fig. S3 CV curve of NiSe nanoparticles based electrode at various scan rates (5 to 100  $\text{mV s}^{-1}$ ) in the potential window of -0.2 to +0.4 V vs SCE.

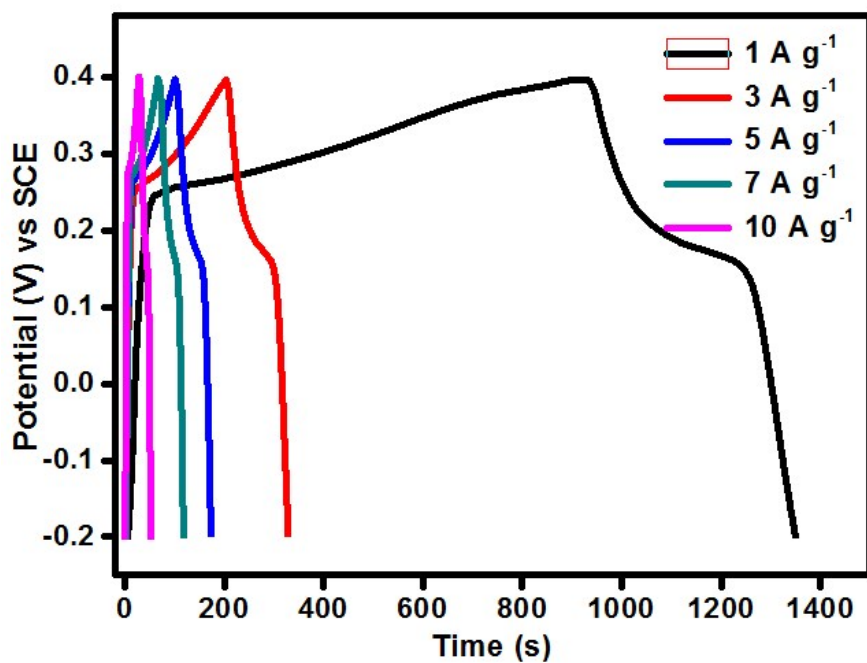


Fig. S4 Galvanostatic charge-discharge curves of NiSe nanoparticles based electrode at various current densities (1 to 10  $\text{A g}^{-1}$ ).

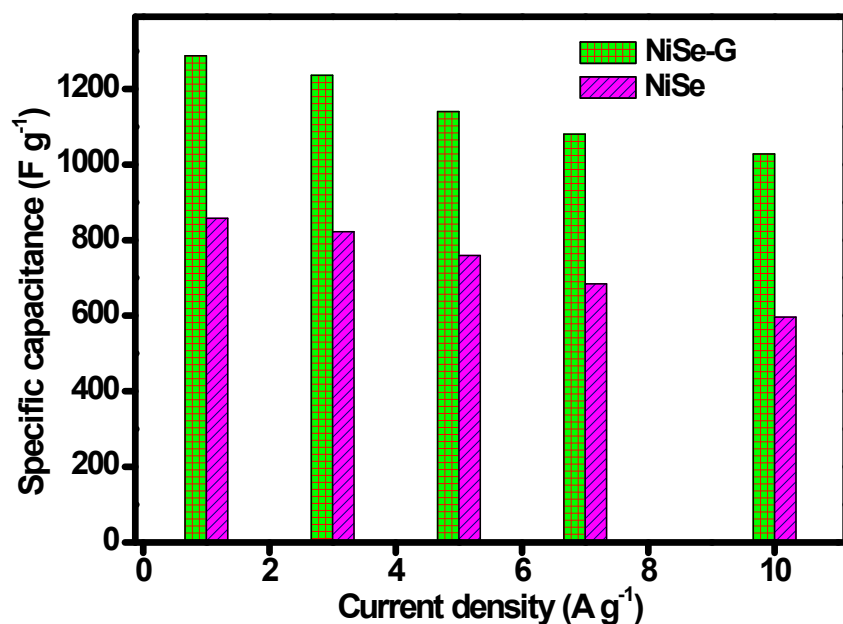


Fig. S5 Specific capacitance as a function of current density for the NiSe and NiSe-G nano hybrids.

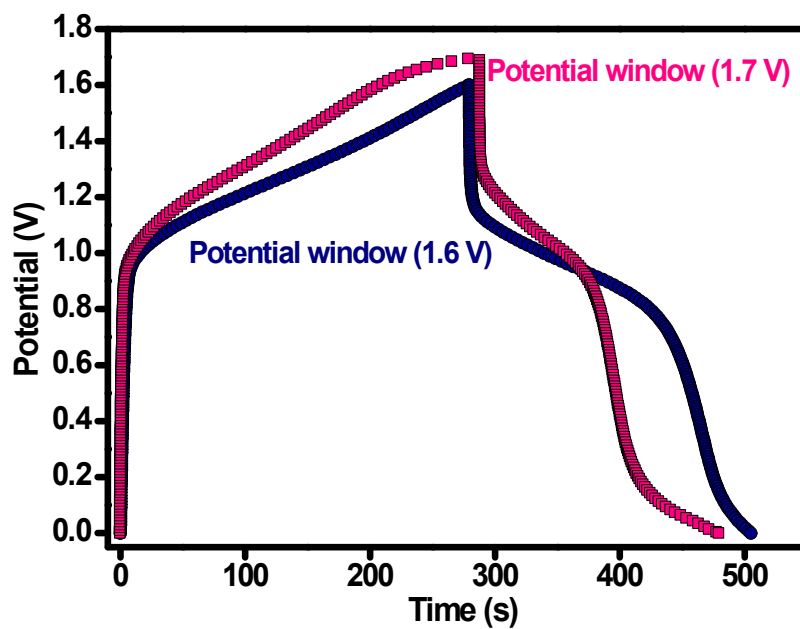


Fig. S6 GCD of NiSe-G||AC ASC device in various potential windows at a current density of 1 A g<sup>-1</sup>.

The discharge time for the potential window of 1.6 V is slightly higher than that for the potential window of 1.7 V and hence, the optimum potential window of NiSe-G||AC ASC device is 1.6 V.