

**1D MnSe@Carbon Nanofiber as High-rate Anode for Sodium-ion Battery:
Electrochemical and Ex situ Mechanistic Investigation of Na⁺ Charge Storage**

Elayaperumal Sujithkrishnan^a, Sivasubramaniam Ragul^a, Shamima Hussain^b, Villa Krishna Harika^c and Perumal Elumalai^{a, *}

^aElectrochemical Energy Storage Lab, Department of Green Energy Technology
Madanjeet School of Green Energy Technologies, Pondicherry University, Puducherry-605014, India

^bUGC-DAE CSR, Kalpakkam Node, Kokilamedu, Tamilnadu - 603104, India

^cDepartment of Green Energy Technology, Madanjeet School of Green Energy Technologies,
Pondicherry University, Puducherry-605014, India

*Corresponding Author.

E-mail: drperumalelumalai@pondiuni.ac.in and drperumalelumalai@gmail.com (P. Elumalai)

Tel. : +91-413-2654867

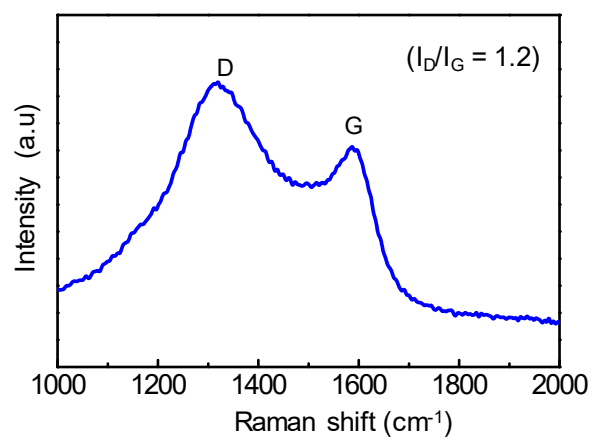


Fig. S1. Raman spectrum recorded for the pristine CNF sample.

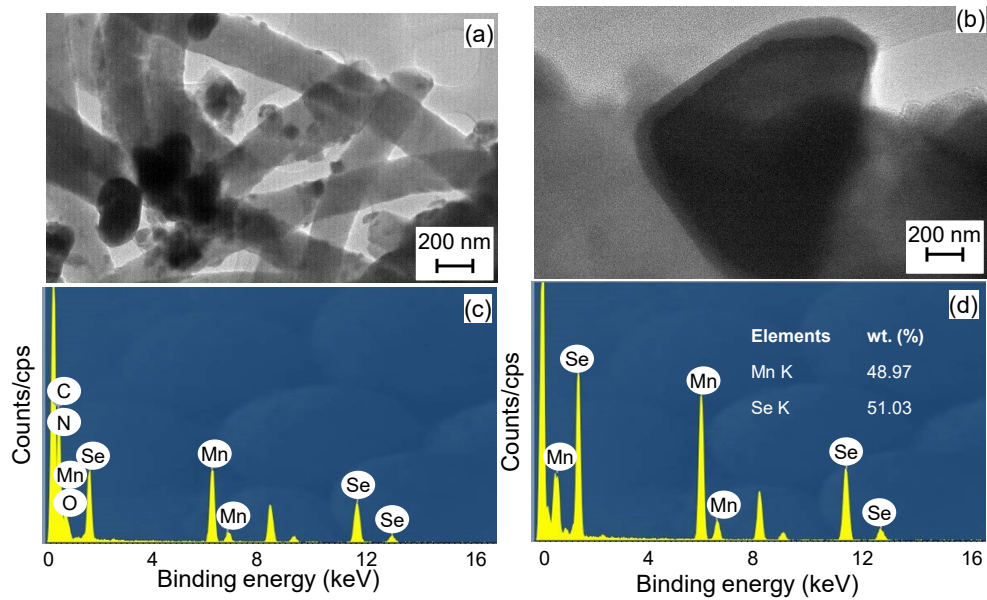


Fig. S2. (a,b) HR-TEM images of the MnSe@CNF samples focusing on the carbon nanofibers and the MnSe nanoparticles, (c) EDAX profile recorded at electrospun MnSe@CNF and (d) EDAX profile recorded at the MnSe nanoparticles embedded on the carbon nanofibers.

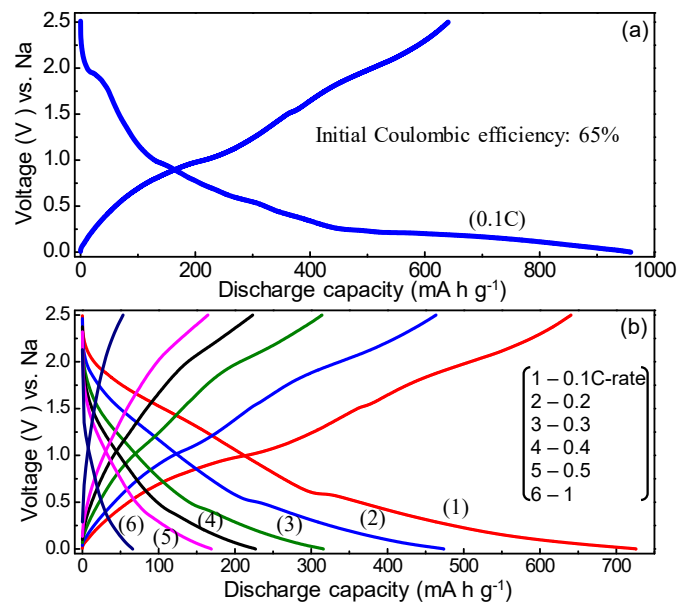


Fig. S3. (a) Initial charge-discharge profile at 0.1C-rate and (b) Charge-discharge profiles recorded at various C-rates for the SIB half-cell containing the MnSe@CNF anode.

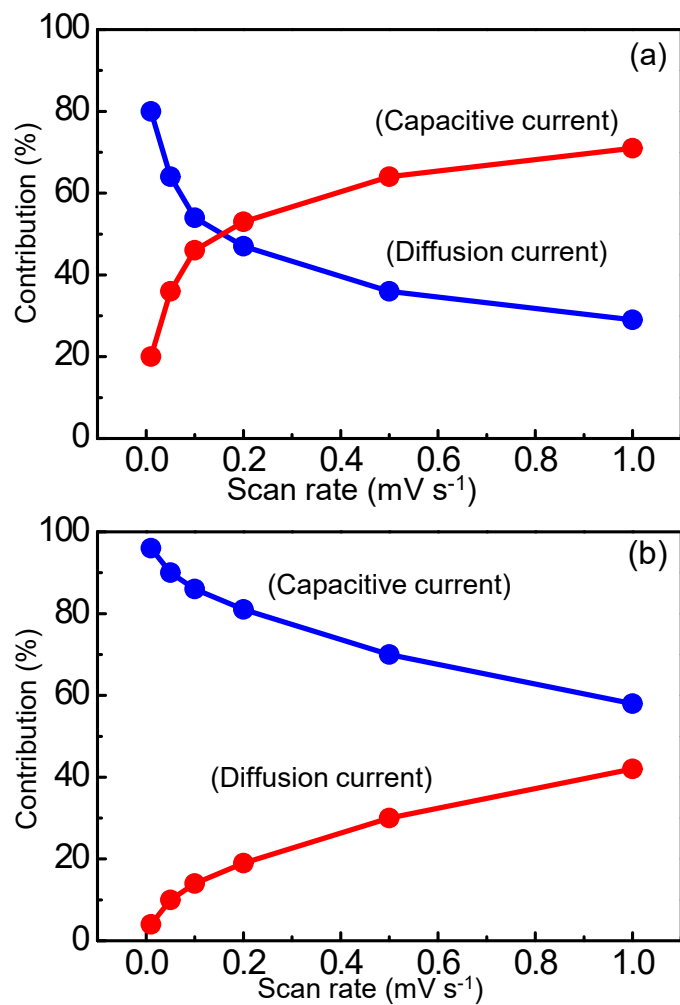


Fig. S4. Deconvoluted capacitive and diffusion percentage at various scan rates for (a) peak current and (b) non-peak current.

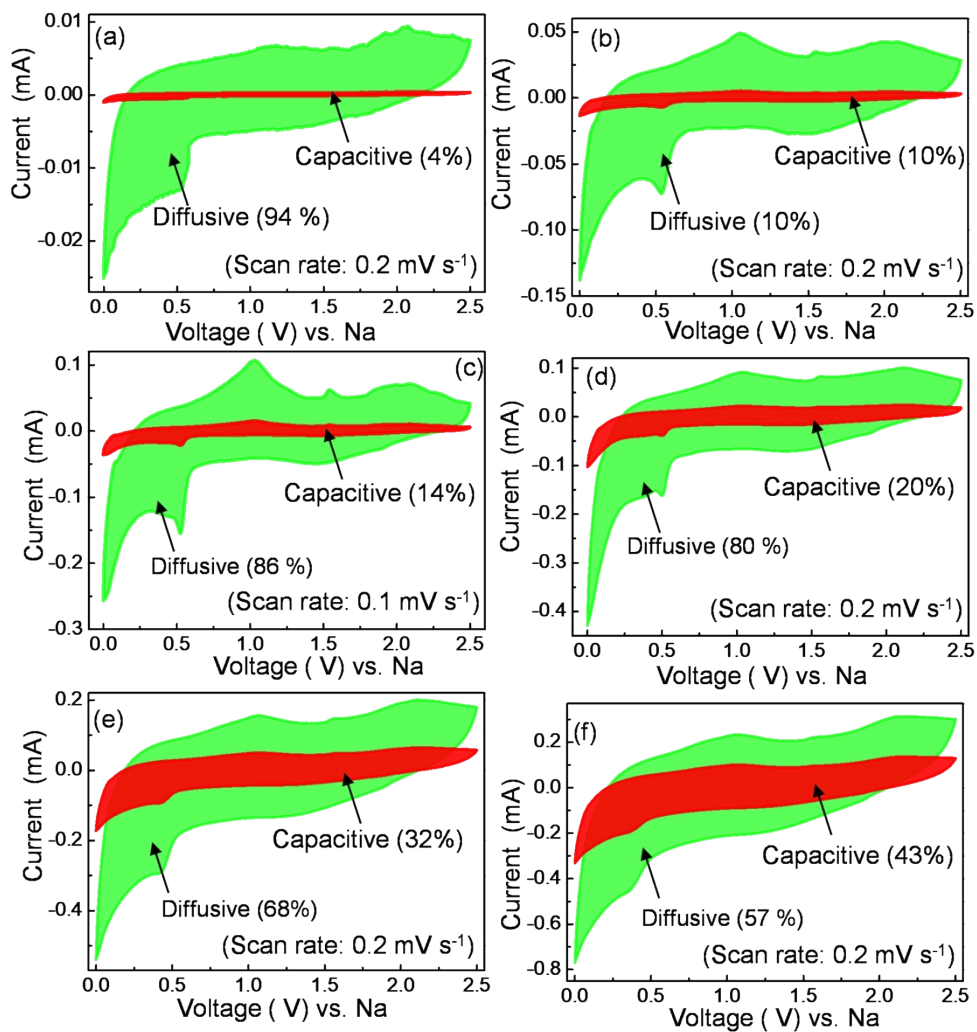


Fig. S5. (a-f) CV profiles representing the capacitive and diffusive current contribution at the anodic and cathodic peak currents at different scan rate for the SIB half-cell having the MnSe@CNF anode (Na|1M NaClO₄|MnSe@CNF).

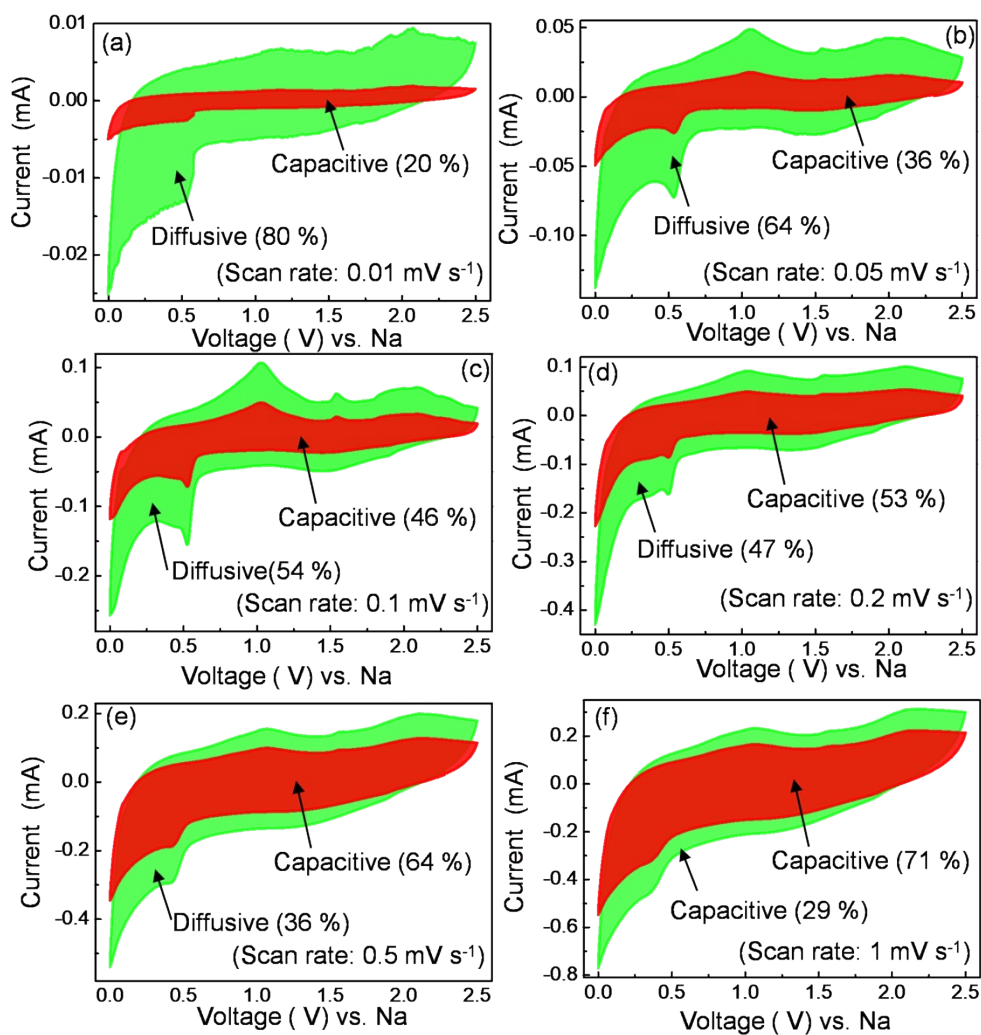


Fig. S6. (a-f) CV profiles representing the capacitive and diffusive current contribution at no peak current potential at different scan rate for the SIB half-cell having the MnSe@CNF anode (Na|1M NaClO₄|MnSe@CNF).