Supporting Information

Fullerene-like $MoSe_2$ Nanoparticles–Embedded CNT Balls with Excellent Structural Stability for Highly Reversible Sodium-Ion Storage

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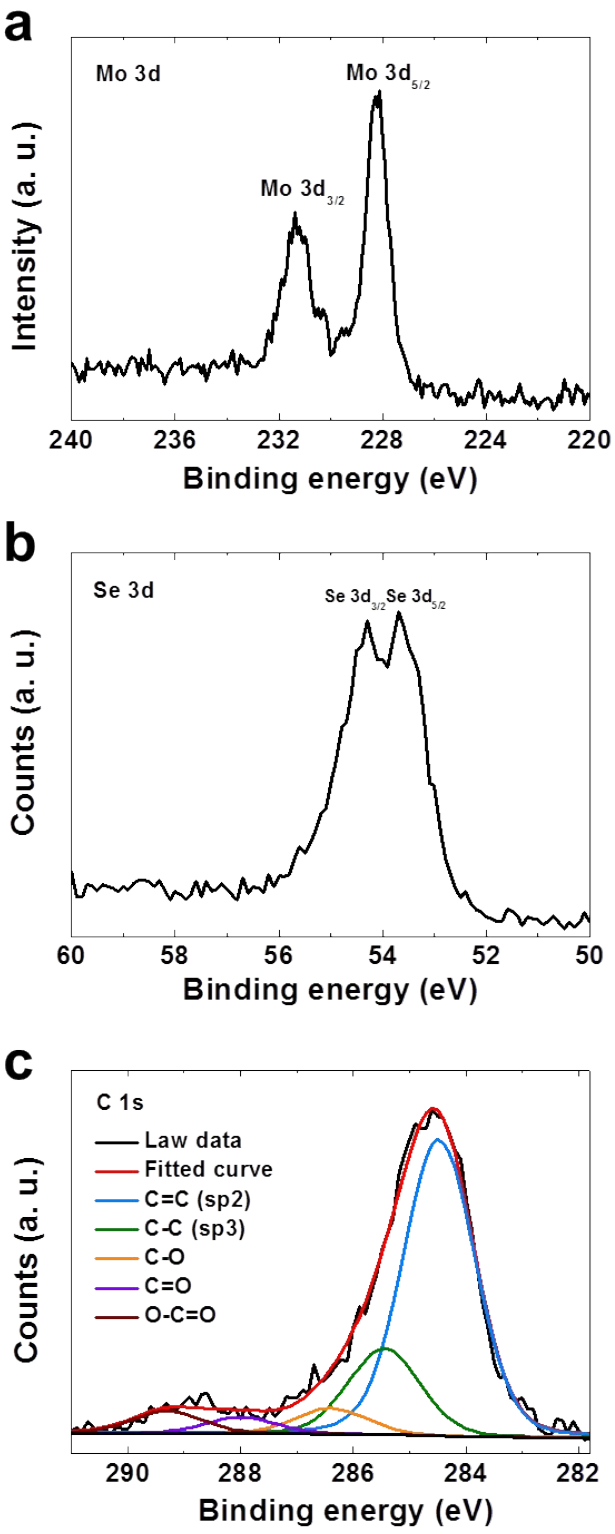

Fig. S1 XPS spectra of the F-$MoSe_2$/CNT composite balls.

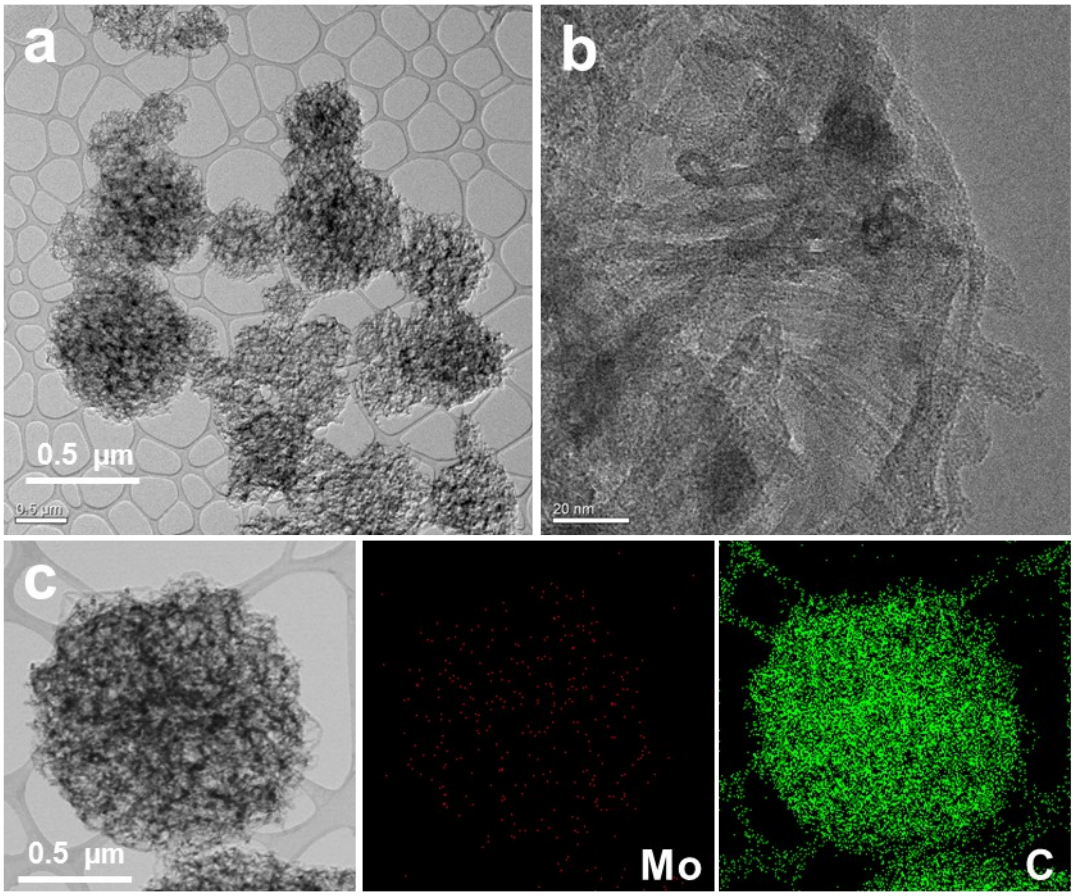

Fig. S2 TEM and elemental mapping images of the CNT balls obtained after dissolution of MoO_2 by diluted hydrogen peroxide: a,b) TEM images and c) elemental mapping images of Mo and C components.

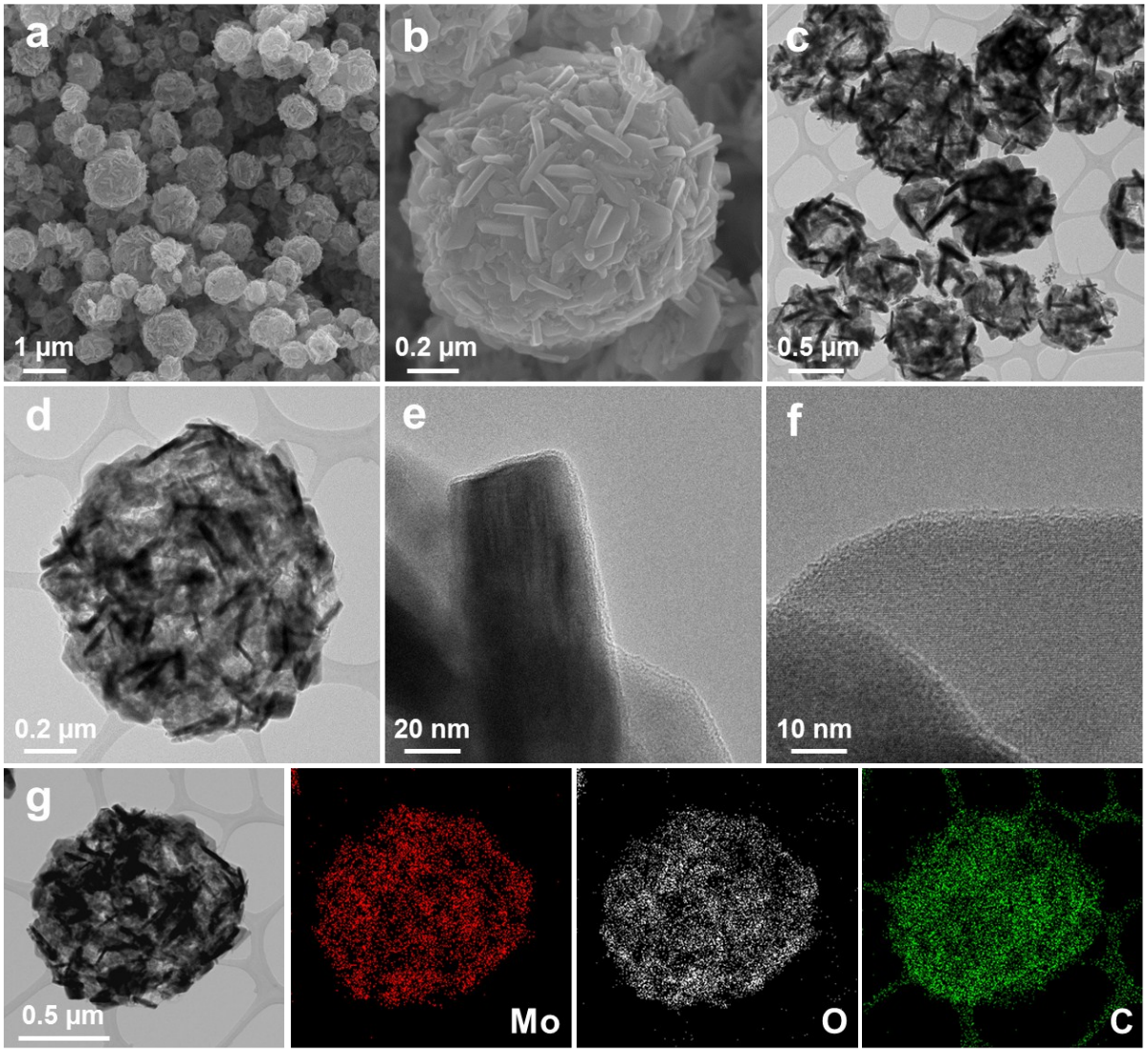

Fig. S3 Morphologies of the MoO_3/CNT composite balls prepared from the spray solution without PS nanobeads: a,b) FE-SEM images, c-e) TEM images, f) HR-TEM image, and g) elemental mapping images of Mo, O, and C components.

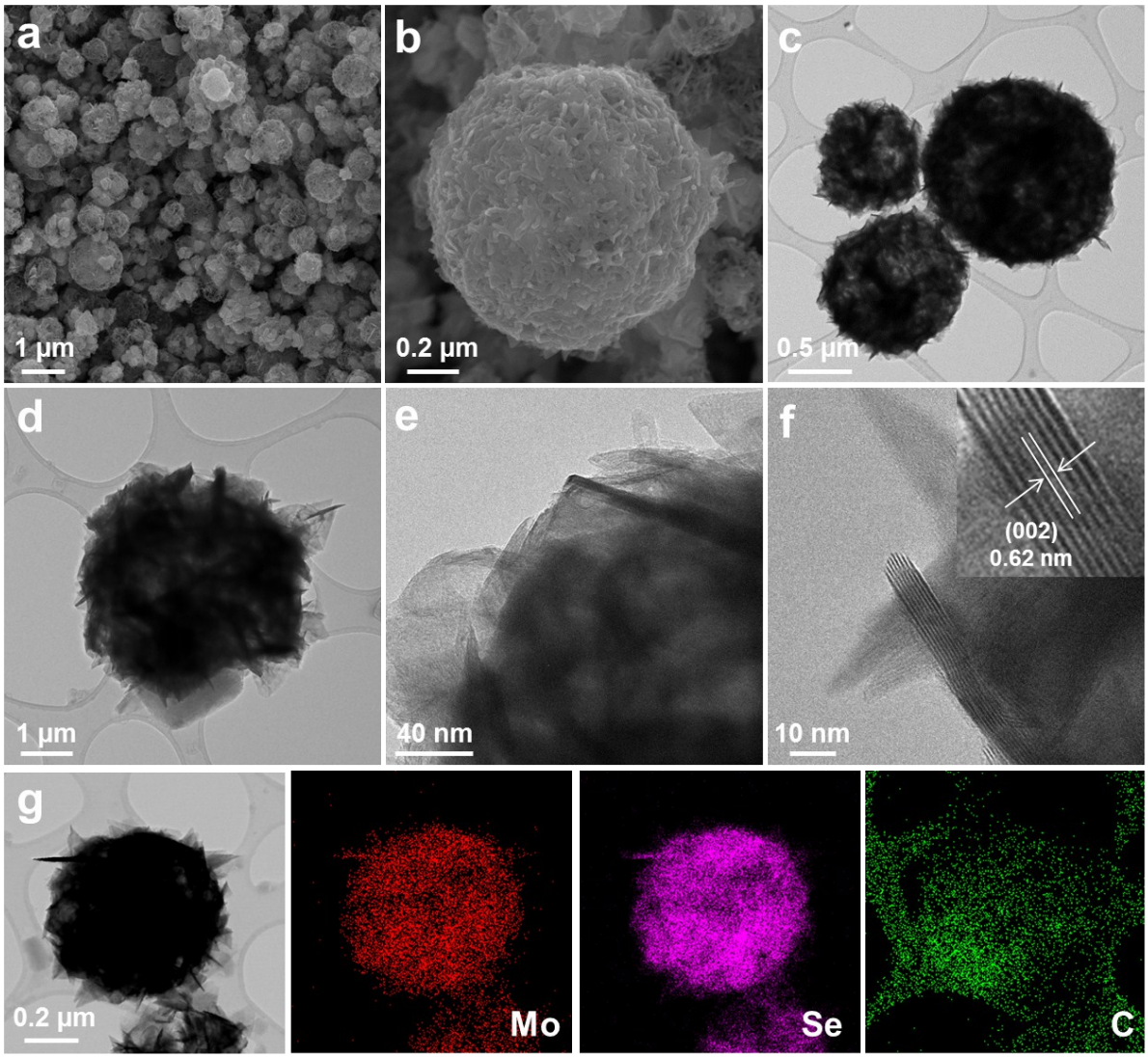

Fig. S4 Morphologies of the N-$MoSe_2$/CNT composite balls prepared by selenization process of the MoO_3/CNT composite balls: a,b) FE-SEM images, c-e) TEM images, f) HR-TEM image, g) elemental mapping images of Mo, Se, and C components.

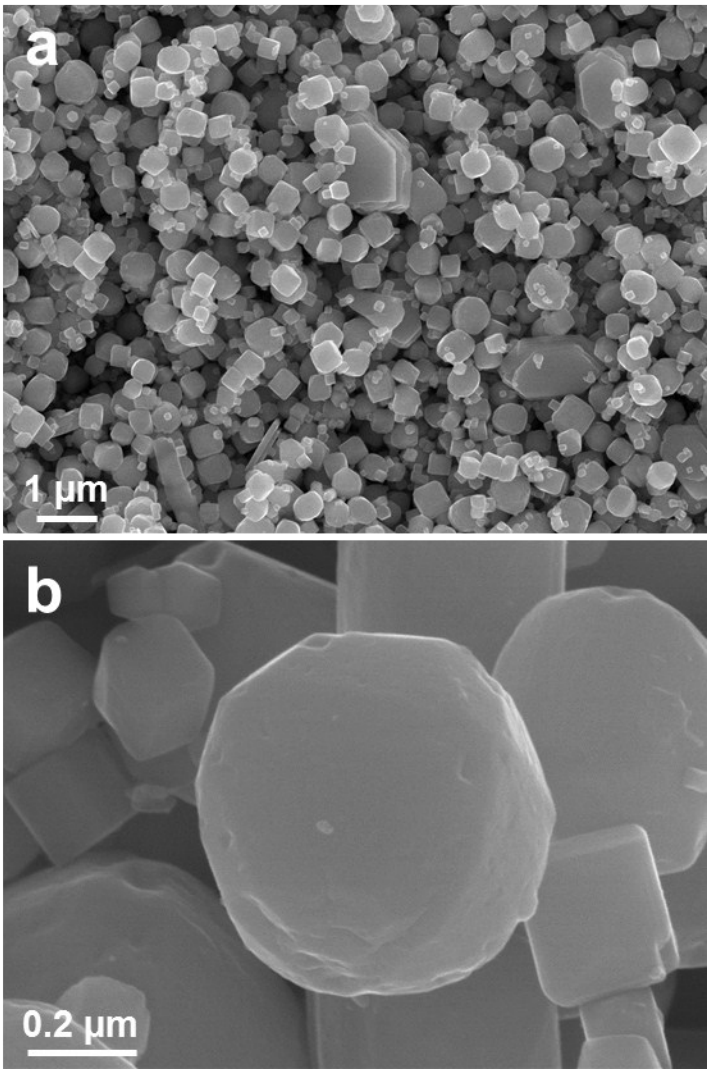

Fig. S5 FE-SEM images of the bare MoO_3 powders prepared by spray pyrolysis.

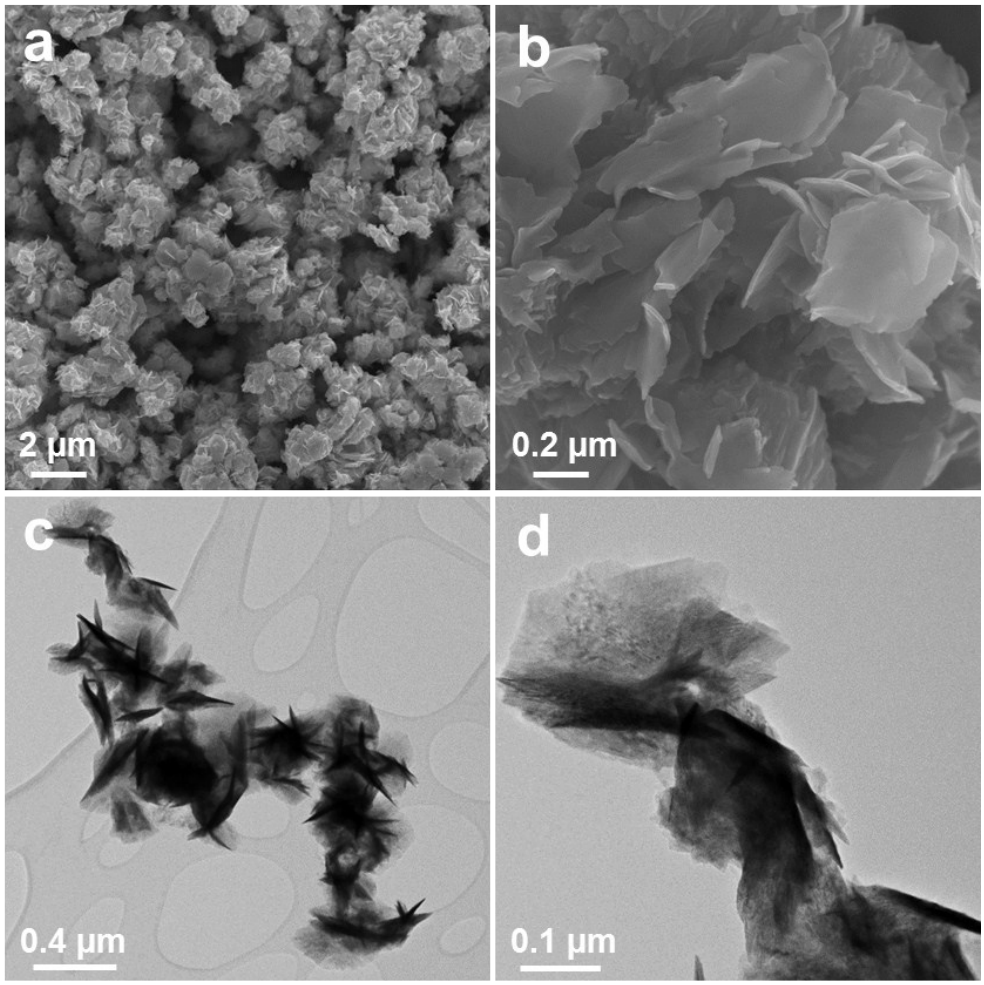

Fig. S6 Morphologies of the ultrathin $MoSe_2$ nanosheets prepared by selenization process of bare MoO_3 powders: a,b) FE-SEM images and c,d) TEM images.

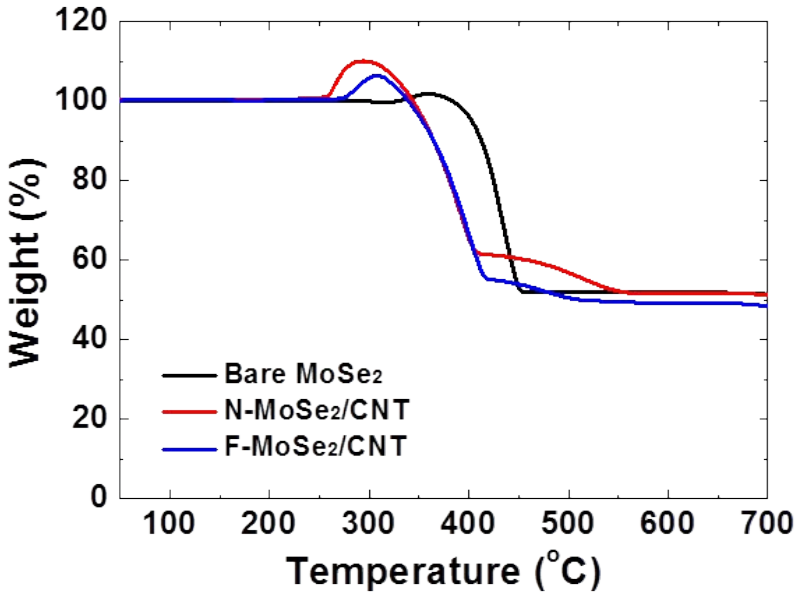

Fig. S7 TG curves of the bare $MoSe_2$, N-$MoSe_2$/CNT, and F-$MoSe_2$/CNT composite balls prepared by spray pyrolysis and selenization processes.

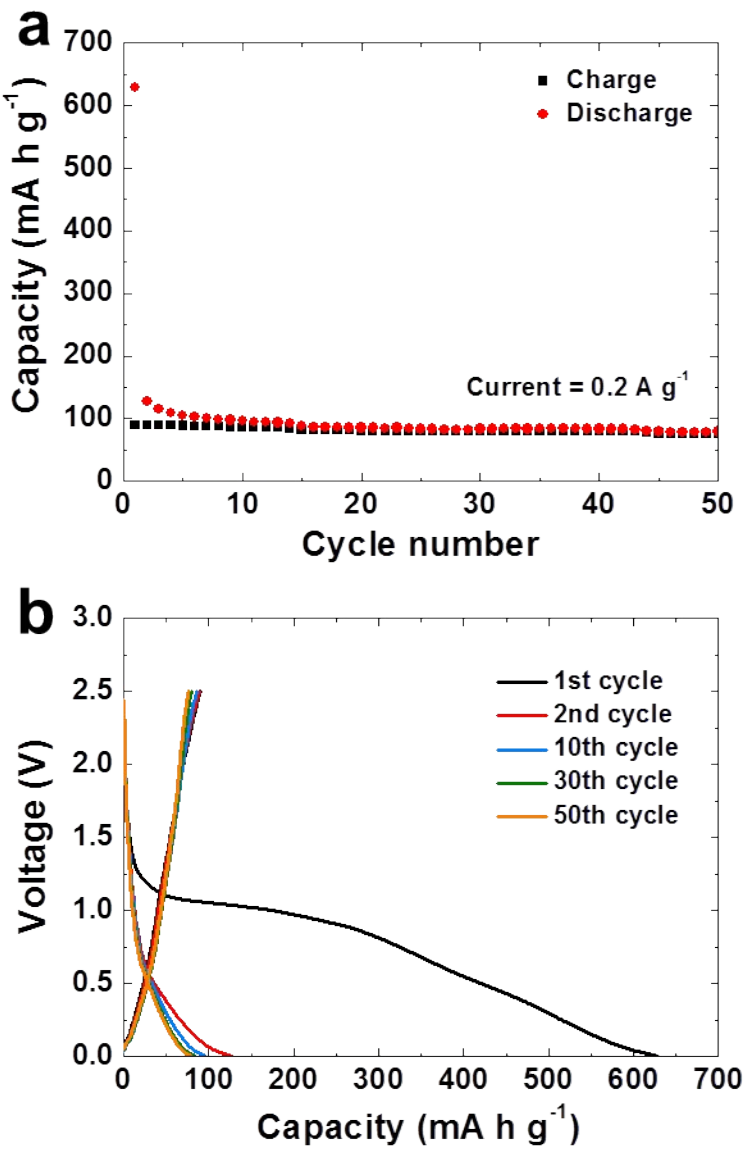

Fig. S8 Na-ion storage properties of the porous CNT balls: a) cycling performance and b) cycle profiles.

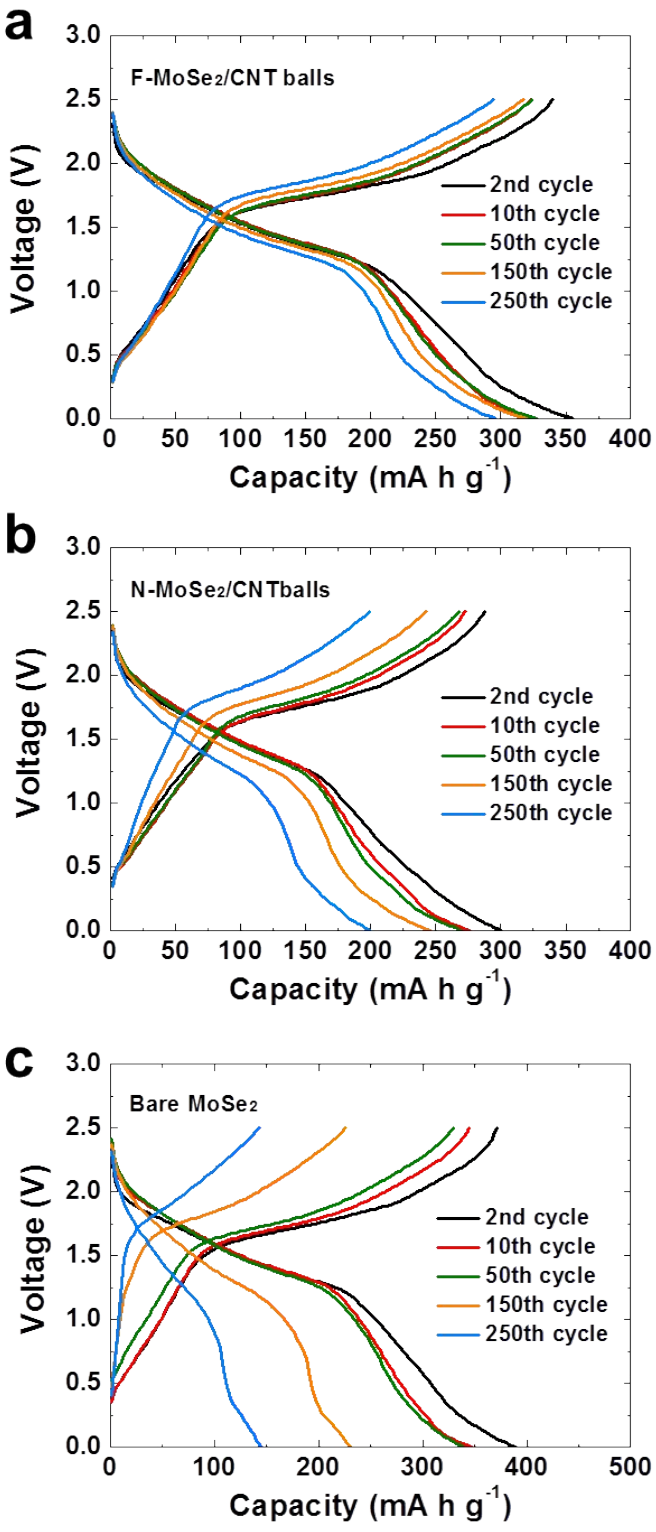

Fig. S9 Cycle profiles of all samples: a) F-$MoSe_2$/CNT composite balls, b) N-$MoSe_2$ /CNT composite balls, and c) bare $MoSe_2$ nanosheets.

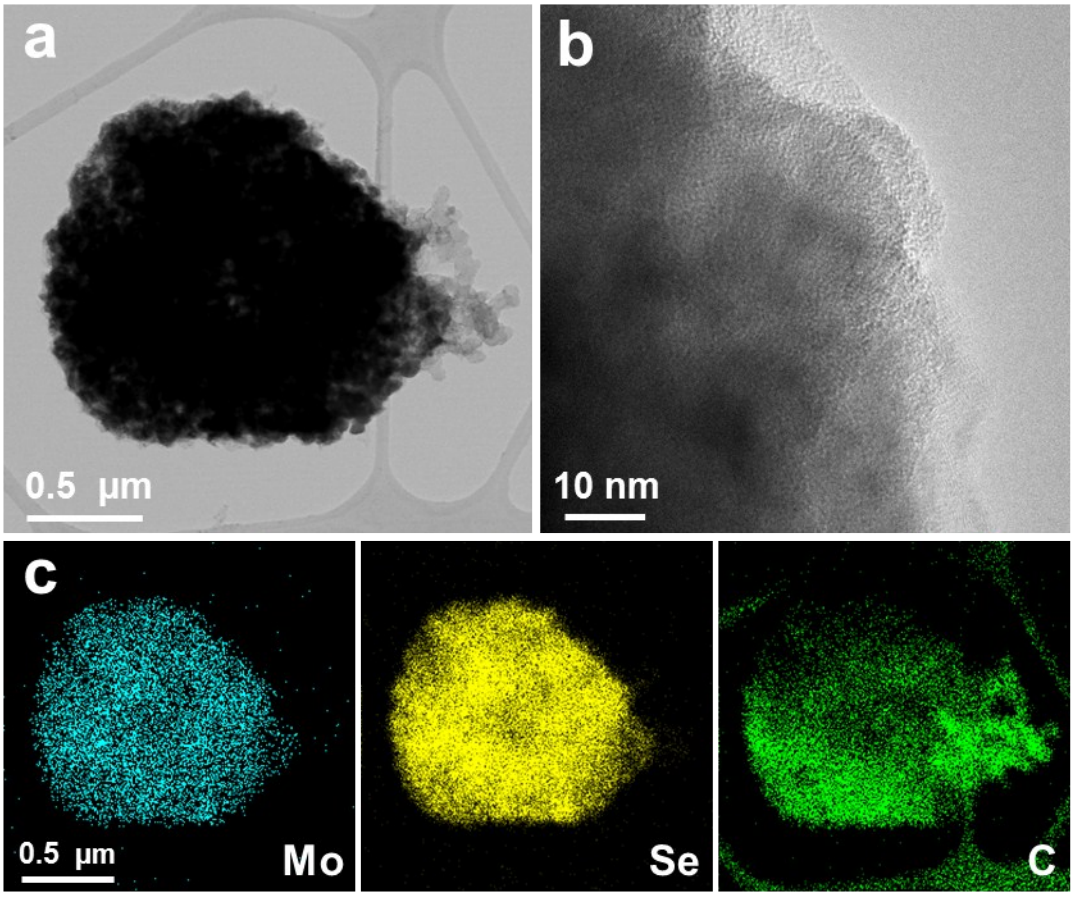

Fig. S10 Morphologies and elemental mapping images of the F-$MoSe_2$/CNT composite balls obtained after 250 cycles: a,b) TEM images and c) elemental mapping images of Mo, Se, and C components.

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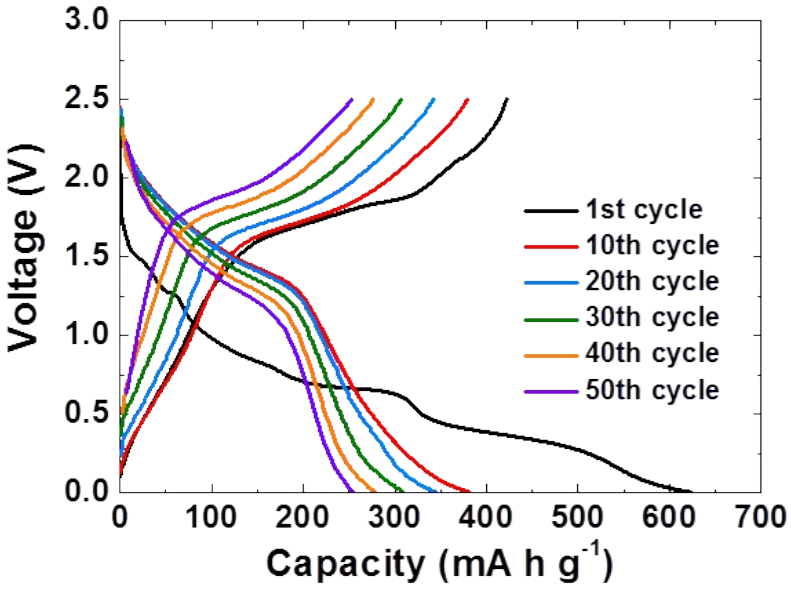

Fig. S11 Cycle profile of the rate performances of the F-$MoSe_2$/CNT composite balls.

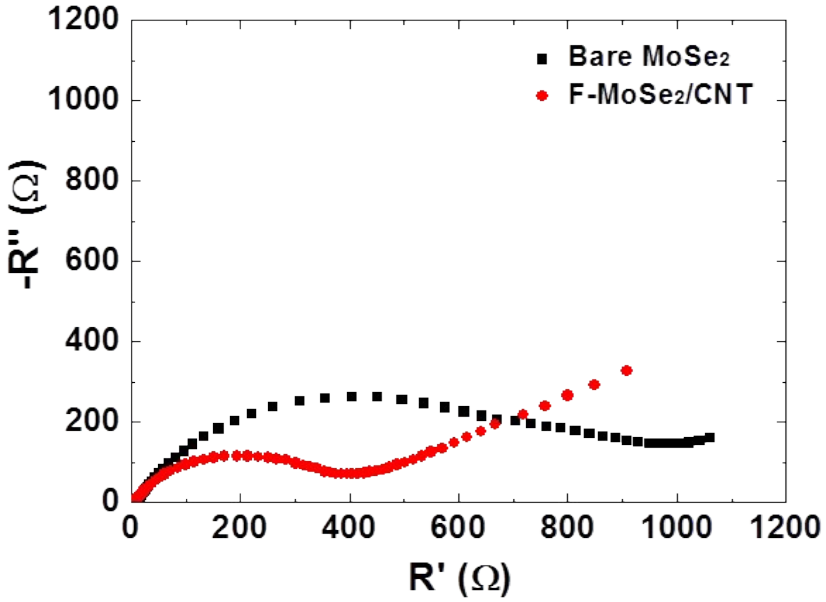

Fig. S12 EIS spectra of bare MoSe2 and F-MoSe2/CNT composite microspheres before cycling.

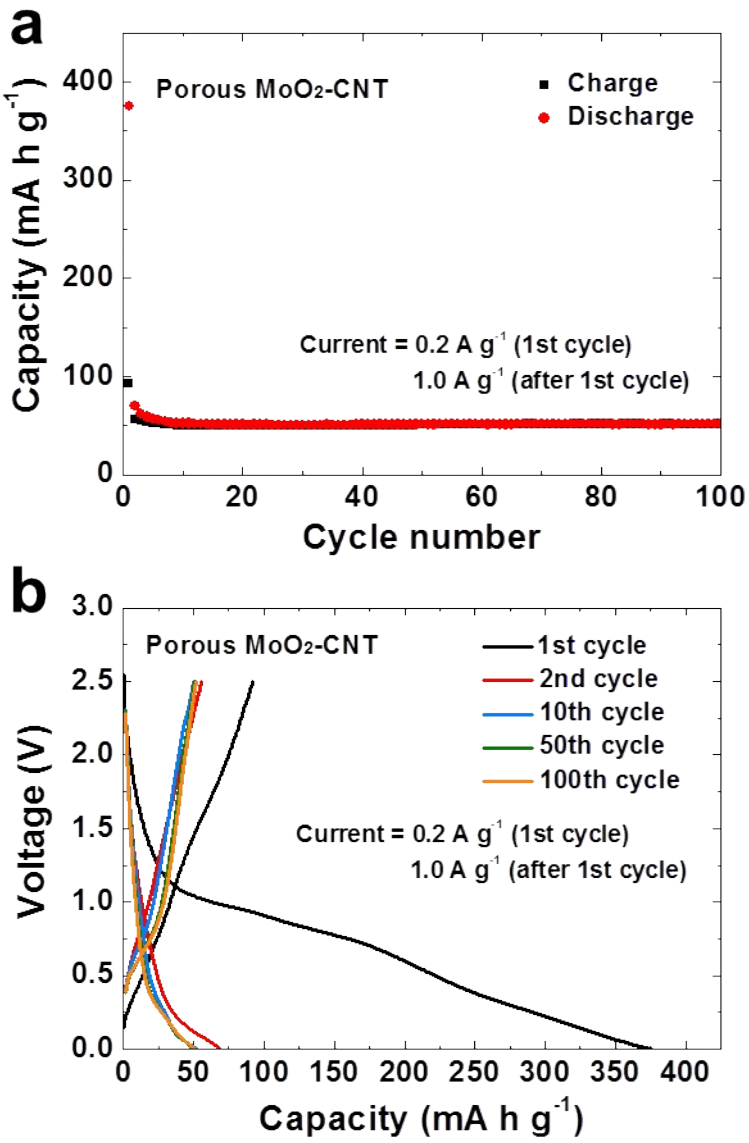

Fig. S13 Na-ion storage properties of MoO_2/CNT composite balls.

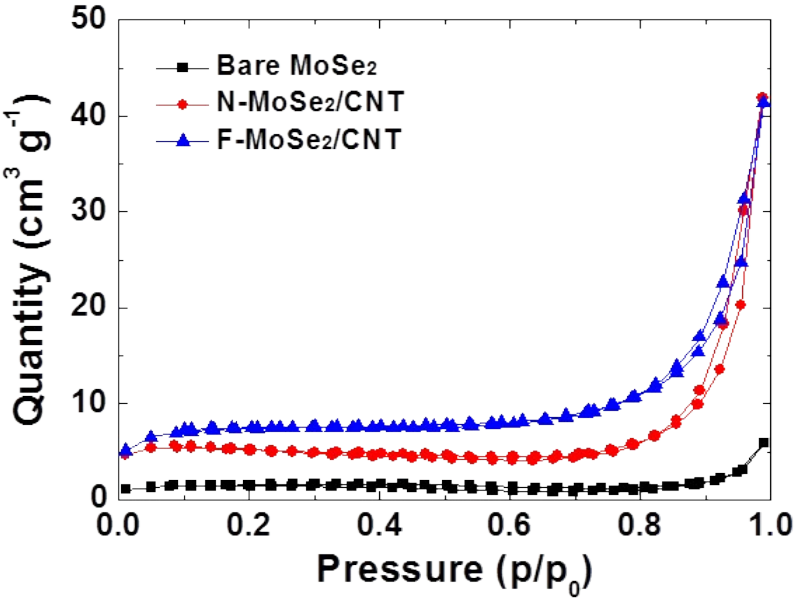

Fig. S14 N_2 adsorption-desorption isotherms measured at 77 K for the bare $MoSe_2$, N-$MoSe_2$/CNT, and F-$MoSe_2$/CNT composite powders.