

Authors response to Reviewer 2 comments

Manuscript ID: nanomaterials-1293795

Manuscript Title: Microwave-assisted rapid synthesis of $\text{NH}_4\text{V}_4\text{O}_{10}$ layered oxide: A high energy cathode for aqueous rechargeable zinc ion battery

Comment. The manuscript in the current form is acceptable. Some suggestions to improve the quality of the paper is as follows. The authors are encouraged to measure the surface area of $\text{NH}_4\text{V}_4\text{O}_{10}$ layered oxide and report in the manuscript. It worth to measure the impedance of the cells at different stages of charge and discharge and calculate the diffusion coefficient based on EIS and compare with the data collected by CV tests.

Response The authors are highly thankful to the reviewer for the favorable response to the publication of this manuscript. Further, the authors wish to acknowledge the valuable time taken by the reviewer to read through our manuscript and provide suggestion/comments that make it better towards publication. All the parts that received corrections are marked in yellow background in the revised manuscript text.

In agreement to the Reviewer comment, we have included the surface area results in the revised manuscript. In addition, we have performed DLS studies to understand the average particle size. Further, we also performed N_2 adsorption-desorption studies to understand the porosity features of the NHVO sample and the results are included in the revised manuscript. However, due to time constraints, we were unable to perform the EIS studies at different charge-discharge states and calculate the diffusion coefficient. The authors are again sincerely thankful to the reviewer for the useful suggestions.

Statements included in the revised manuscript:

DLS method was used to determine that the particle-size distribution for the NHVO sample. The result shown in **Fig. R1a** confirm that the average particle size was less than 600 nm and corroborated well with the electron microscopy results. BET N_2 adsorption-desorption analysis to determine the surface area confirmed that the layered NHVO sample demonstrates a type IV isotherm with H4 hysteresis (**Fig. R1b**). Further, the surface area and total pore volume was determined to be $13.34 \text{ m}^2 \text{ g}^{-1}$ and $0.13 \text{ cm}^3 \text{ g}^{-1}$, respectively. The existence of H4 hysteresis indicates that the NHVO sample consists of a microporous network with slit pore geometry. The steep increase of relative partial pressure (P/P_0) ~ 0.99 typically corresponds to a uniform particle size distribution in the NHVO sample. The Barrett–Joyner–Halenda (BJH) pore size distribution plot in **Fig. R1c** is clearly indicative of the pore size distribution to be in the micrometre range. These results thus confirm that the determined surface area and porous characteristics can ultimately influence the electrochemical property of the prepared NHVO sample.

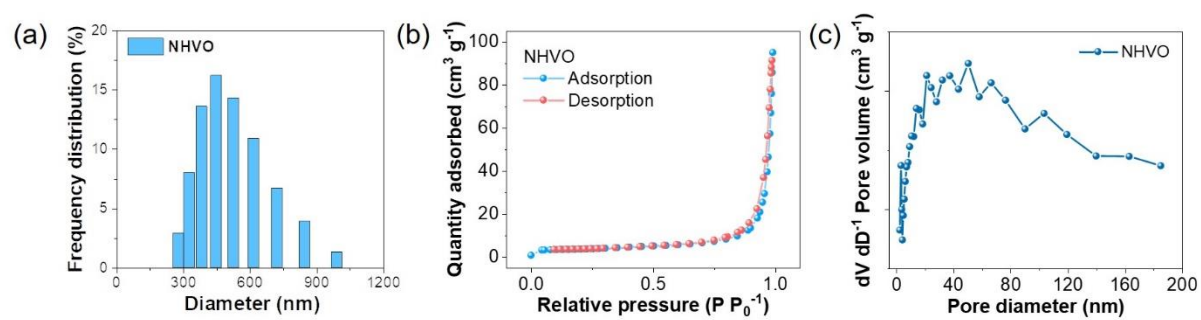


Figure R1. (a) DLS result for the prepared NHVO (b) N₂ adsorption/desorption plot and (c) corresponding pore-size distribution plot for the prepared NHVO sample.