Supporting information

Bicontinuous Hierarchical $Na_7V_4(P_2O_7)_4(PO_4)$/C Nanorod-Graphene Composite with Enhanced Fast Sodium and Lithium Ions Intercalation Chemistry

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S1:

Description of calculation process for apparent ion diffusion coefficents.

The ion diffusion coefficient can be calculated from the low frequency line according to the following equation:

$$D=R^2T^2/2A^2n^4F^4C^2\sigma^2 \quad (1)$$

Where R is the gas constant, T is the absolute temperature, A is the surface area of the electrode, n is the number of electrons per molecule during oxidation, F is the

Faraday constant, C is the concentration of ion, σ is the Warburg factor which is relative with Z'.

$$Z'=B+\sigma\omega^{-1/2} \quad (2)$$

Where B is a constant, ω is the frequency. Based on the relationships between Z' and the reciprocal square root of frequency in the low frequency region, the ion diffusion coefficients are calculated.

S2: The relationship between Z' and $\omega^{-1/2}$ of the low-frequency of the Nyquist plots for the $Na_7V_4(P_2O_7)_4(PO_4)$/C nanorod-graphene composite and the pristine $Na_7V_4(P_2O_7)_4(PO_4)$/C nanorod.