***Supporting Information***

**Ammonium-ion Batteries with a Wide Operation-temperature Window from -40 to 80 °C**

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**Calculations about energy density and power density of the NiHCF@CNTs//poly(1,5-NAPD) full cell**

The energy density and powder density of NiHCF@CNTs//poly(1,5-NAPD) cell were calculated by following equations:

Herein, *E* represents the energy density (Wh kg-1). *C* is the discharge capacity of the cell (mAh). *V* is the average discharge voltage of the cell (V). *M* is the total mass (Kg) of poly(1,5-NAPD) and NiHCF@CNTs, respectively. *P* represents the power density (W kg-1), and *t* is time for full discharge (h).