

Description of Additional Supplementary Files

Supplementary Movie 1: Electric fan powered by the 4.5V LCO/Gr pouch cell using EHFB electrolyte at almost -100 °C

Supplementary Movie 2: Electric fan failed to be powered by the 4.5V LCO/Gr pouch cell using Base electrolyte at -86 °C

Supplementary Movie 3: Record of electric fan powered by the 4.5V LCO/Gr pouch cell using EHFB electrolyte at temperature from -102 °C to -99.8 °C with advanced cold trap system

Supplementary Movie 4: Record of temperature variety from -100 °C to -90 °C with advanced cold trap system

Supplementary Movie 5: Record of temperature variety from -90 °C to -80 °C with advanced cold trap system

Supplementary Movie 6: Record of temperature variety from -80 °C to -70 °C with advanced cold trap system

Supplementary Movie 7: Record of temperature variety from -70 °C to -60 °C with advanced cold trap system

Supplementary Movie 8: Record of temperature variety from -60 °C to -50 °C with advanced cold trap system

Supplementary Movie 9: Record of temperature variety from -50 °C to -40 °C with advanced cold trap system

Supplementary Movie 10: Record of temperature variety from -40 °C to -30 °C with advanced cold trap system

Supplementary Movie 11: Record of temperature variety from -30 °C to -20 °C with advanced cold trap system