

Cuberg HP-5P Cells (INL P500)

Matt Shirk
Chinh Ho

Update Report
May 2020

Benchmark Evaluation

Start Date: 1/2020

End Date: 6/2020

www.inl.gov

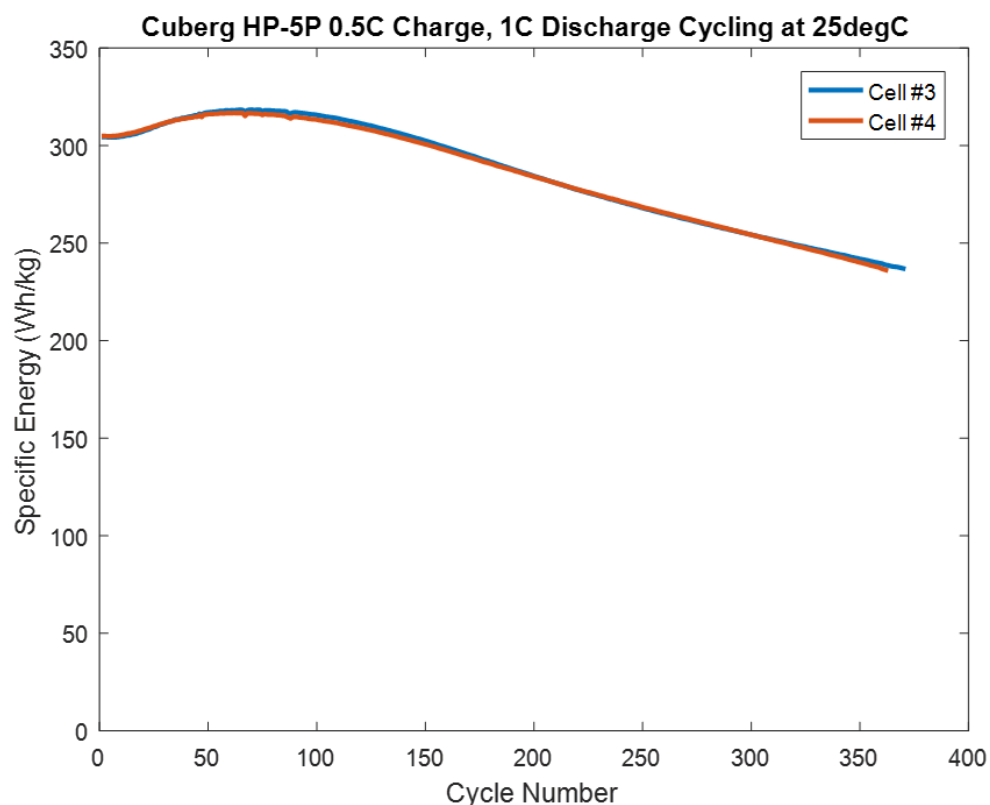


INL/LTD-20-58603

Cuberg HP-5P Cycle Life Testing at INL

Specific Energy for 0.5C Charge, 1C Discharge Cycle Test at 25°C

- Cells cycled to 20% capacity loss relative to BOL 1C discharge capacity
- 15-minute rests after each charge and discharge



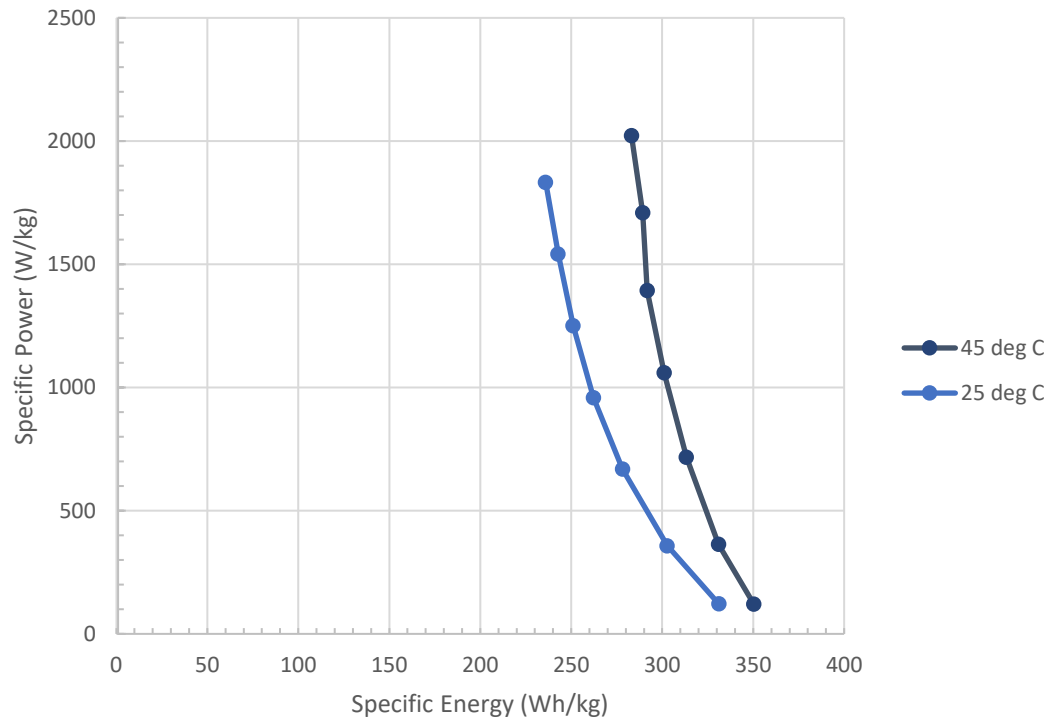
Cuberg HP-5P	
V_{\min} , 1C, 25°C (V)	3.0
V_{\max} , 25°C (V)	4.3
$V_{\text{nominal } C_{20}/20}$ (V)	3.848
C_{20} Rated Capacity (Ah)	5.1
Weight (kg)	0.0529
Volume (L)	0.0295
Chemistry	Li Metal Anode

BOL Average Capacity & Energy		
	Ah	Wh/kg
C/20, 25°C	5.07±0.02	369±2
1C, 45°C	4.65±0.01	332±2
1C, 25°C	4.28±0.01	303±1

1C Discharge Cycles to EOL	
Cell 3, 25°C	371
Cell 4, 25°C	363

Cuberg HP-5P Rate Capability Testing at INL

Cuberg HP-5P Cell Rate Test



Cuberg HP-5P	
V_{\min} (V)	2.5-3.0
V_{\max} (V)	4.2-4.3
$V_{\text{nominal } C_{20}/20}$ (V)	3.848
C_{20} Rated Capacity (Ah)	5.1
Weight (kg)	0.0529
Volume (L)	0.0295
Chemistry	Li Metal Anode

BOL Average Capacity & Energy		
	Ah	Wh/kg
$C/20, 25^{\circ}\text{C}$	5.07 ± 0.02	369 ± 2
$1\text{C}, 45^{\circ}\text{C}$	4.65 ± 0.01	332 ± 2
$1\text{C}, 25^{\circ}\text{C}$	4.28 ± 0.01	303 ± 1

Notes

- Two constant-current discharges performed at each of the following rates: C/3, 1C, 2C, 3C, 4C, 5C, 6C
- Power is calculated by dividing energy discharged over discharge time
- Rate capability tests performed at beginning-of-life
- Voltage limits are dependent on rate and temperature
 - See cell configuration slide for details