



MOLICEL® INR-21700-P42A 4.2Ah Power cell

2018-10

E-ONE MOLI ENERGY CORP



Confidential

- ❖ **MOLICEL® INR-21700-P42A 4.2Ah power cell**
- ❖ **Cell is capable of continuous cycling at high rates up to 8C**
- ❖ **Key Characteristics:**
 - Low cell impedance: <20mOhm DCR at 10s
 - 2C (8.4A) charge capability
 - -40°C discharge capability



Product Data Sheet



LITHIUM-ION RECHARGEABLE BATTERY

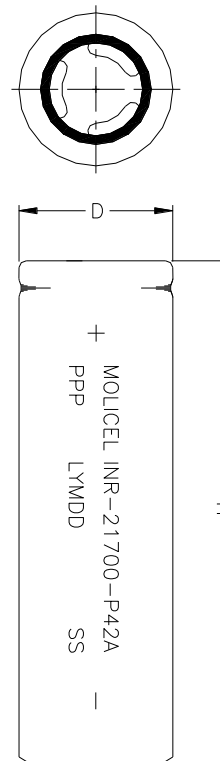
PRODUCT DATA SHEET MODEL **INR-21700-P42A**

Performance Characteristics

| | | |
|-------------------|-------------|---------------------|
| Capacity | Typical | 4200 mAh 15.5 Wh |
| | Minimum | 4000 mAh 14.7 Wh |
| Cell Voltage | Nominal | 3.6 V |
| | Charge | 4.2 V |
| | Discharge | 2.5 V |
| Charge Current | Standard | 4.2 A |
| Charge Time | Standard | 1.5 hr |
| Discharge Current | Continuous | 45 A |
| Temperature | Charge | 0°C to 60°C |
| | Discharge | -40°C to 60°C |
| Energy Density | Volumetric | 615 Wh/l |
| | Gravimetric | 230 Wh/kg |
| Typical Impedance | AC(1 KHz) | <10 mΩ |
| | DC (10A/1s) | 16 mΩ |

Physical Characteristics

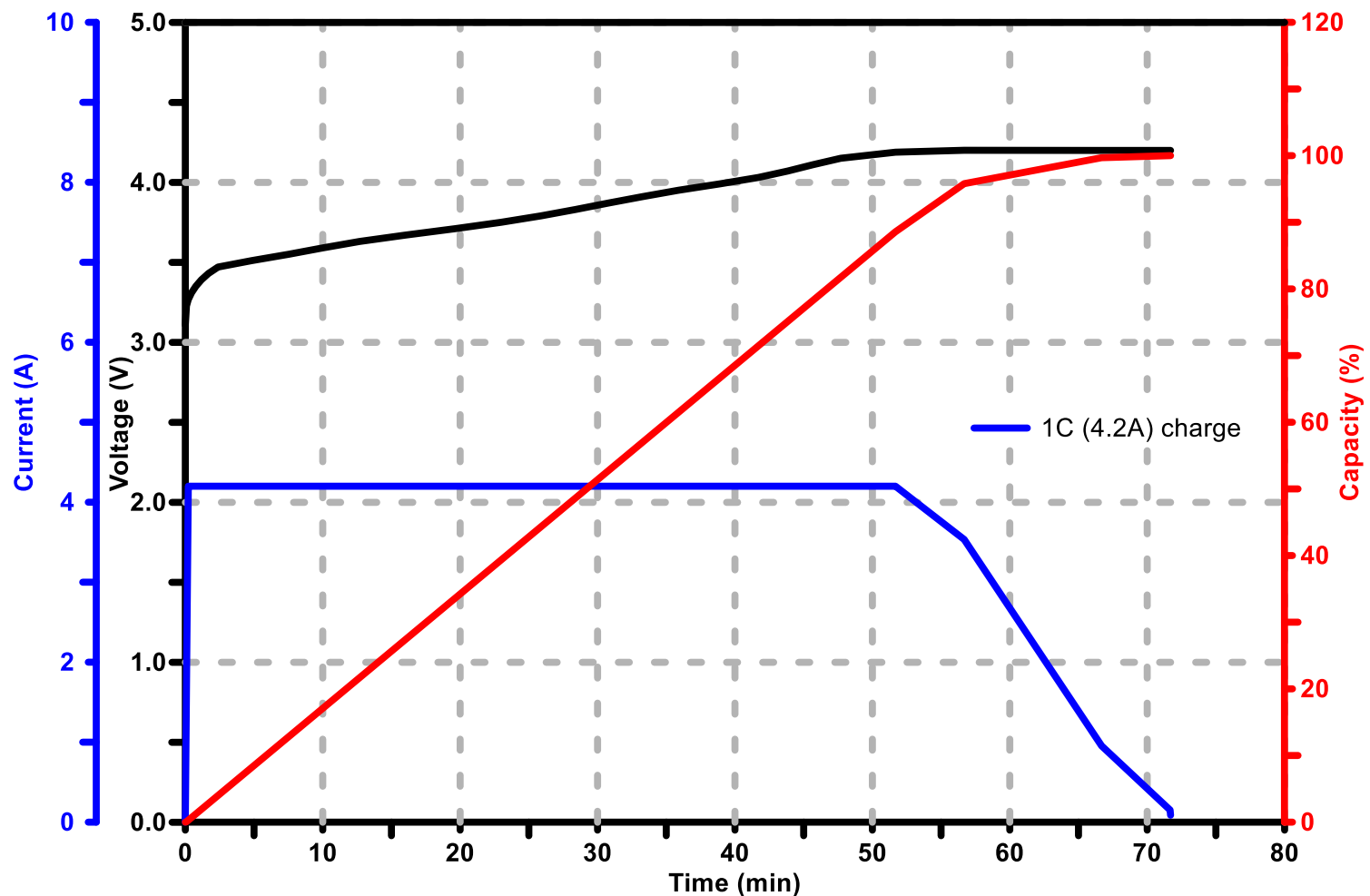
| | |
|----------|----------------|
| Shape | Cylindrical |
| Can | Steel |
| Diameter | 21.55 mm (Max) |
| Height | 70.15 mm (Max) |
| Weight | 67 g (Typical) |



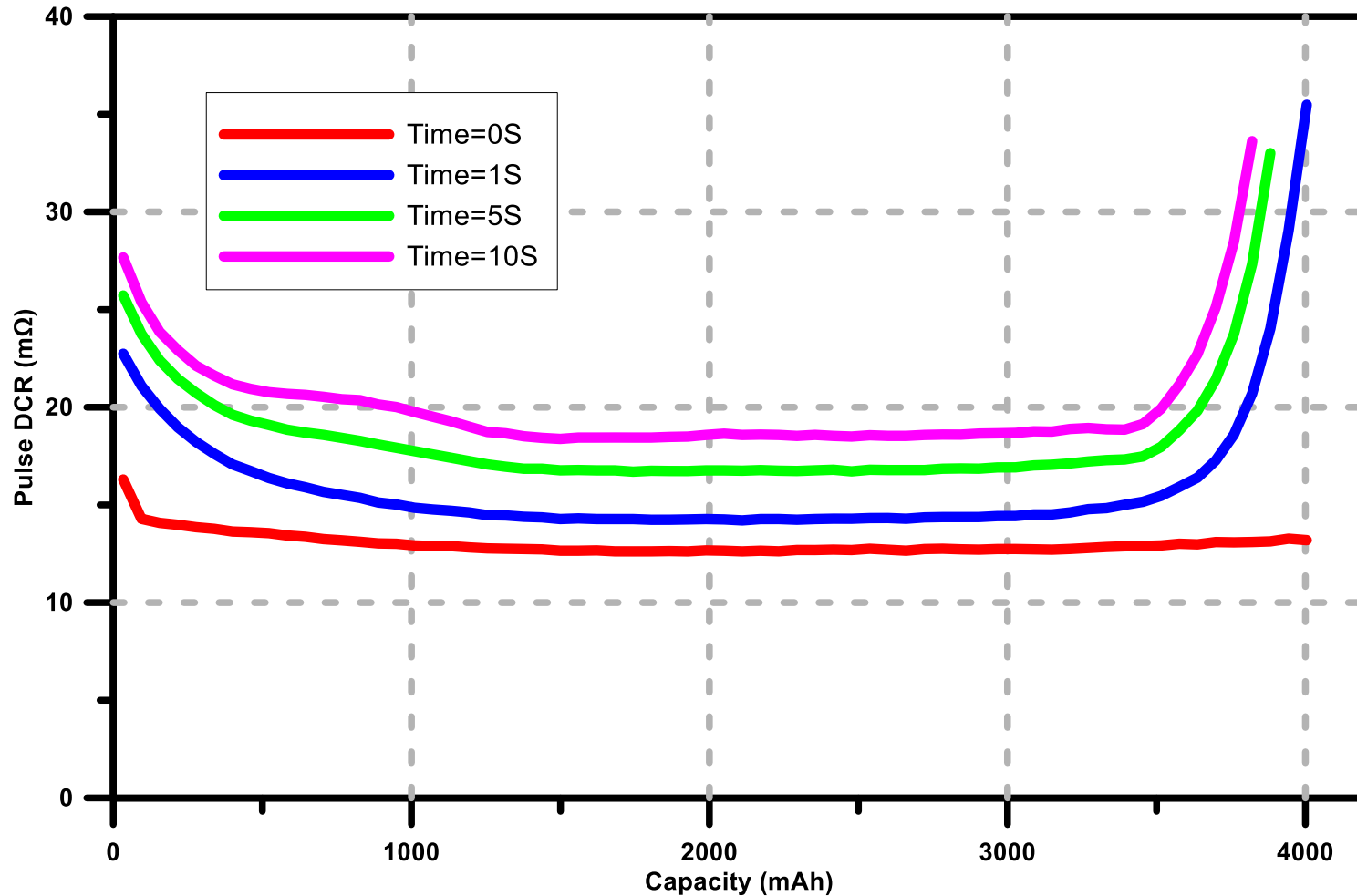
Charge / Discharge Characteristics



23 °C Charge Characteristics

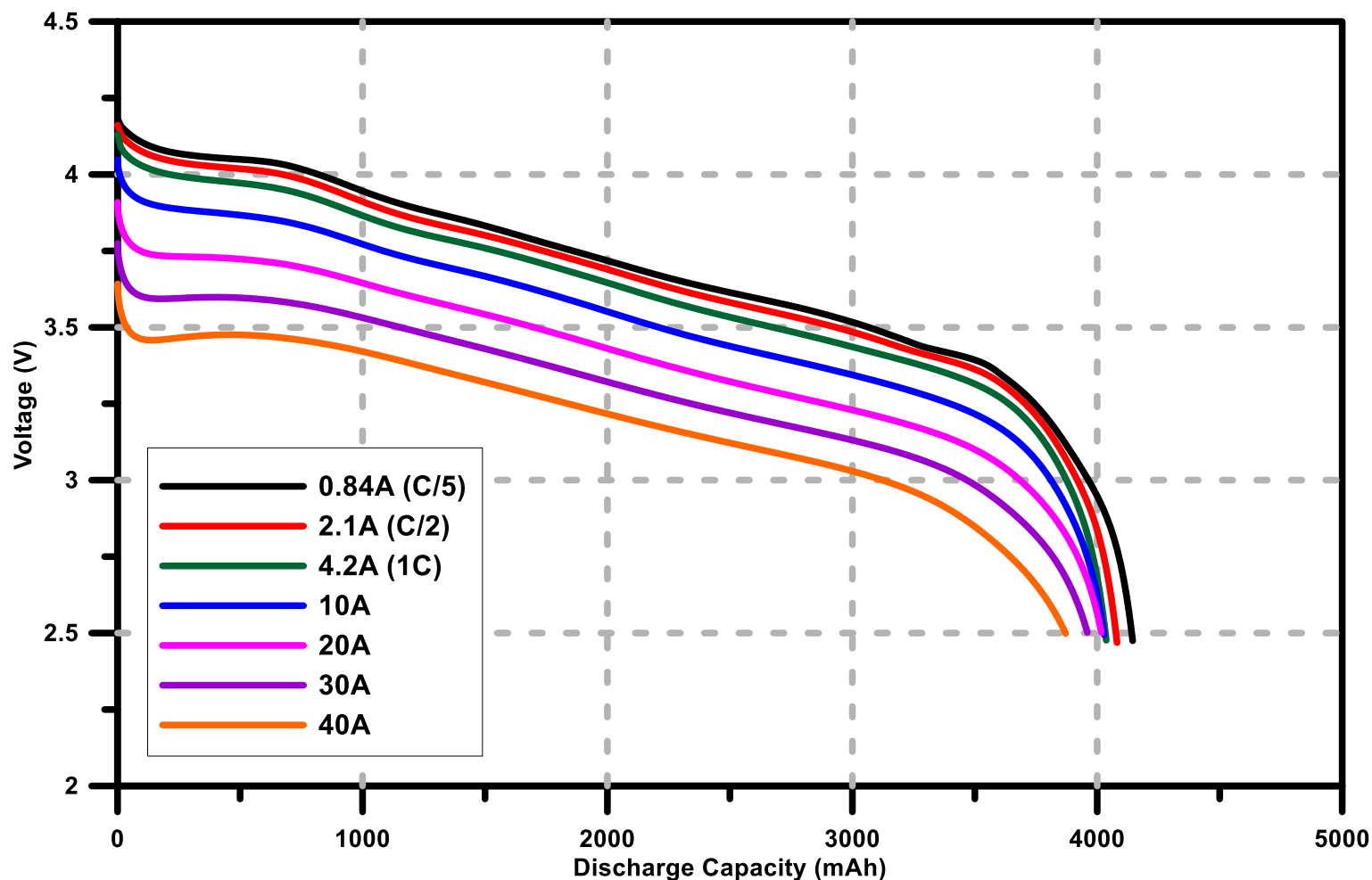


1A/10A Pulse DCR



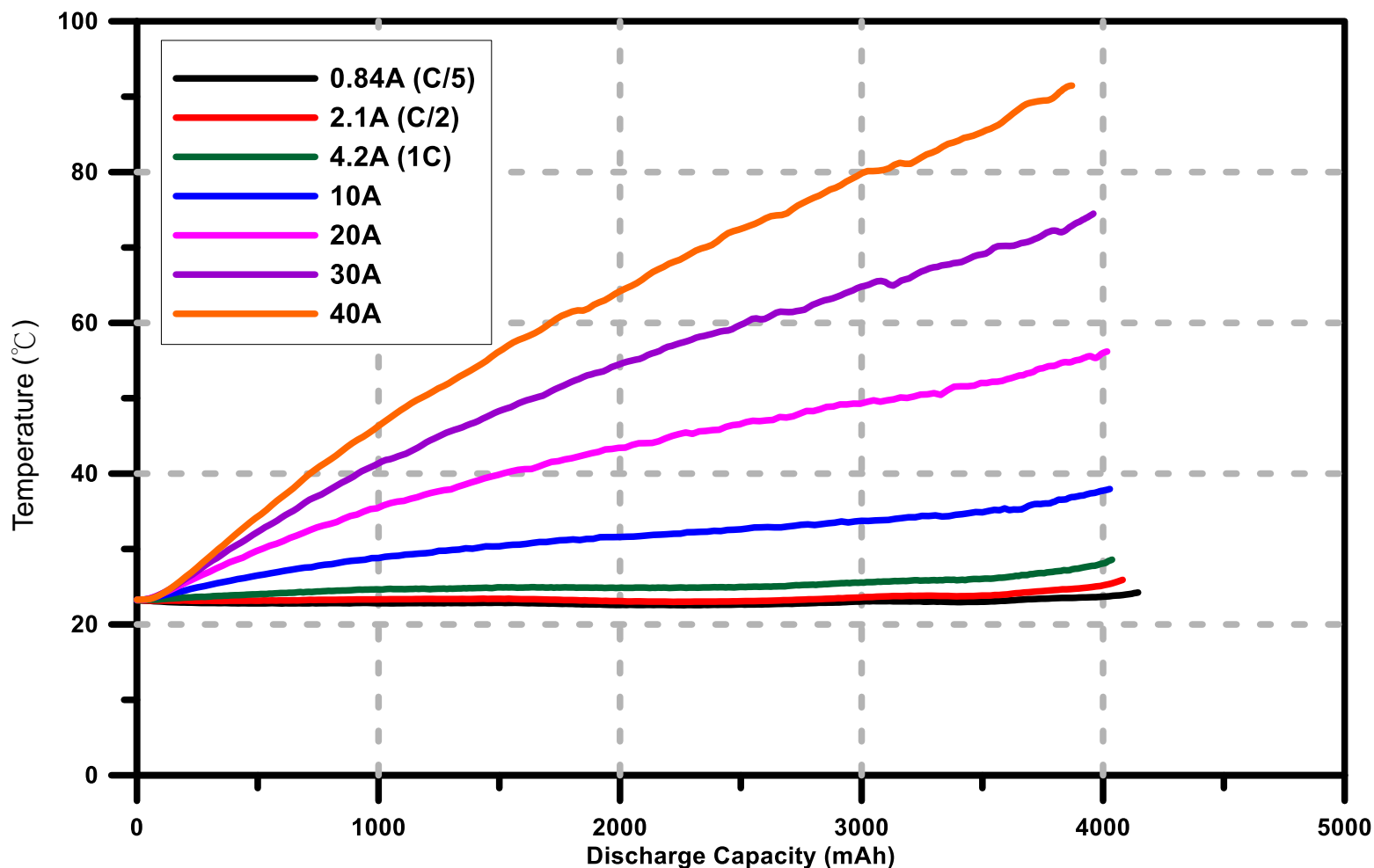
- ❖ Charge: CCCV 4.2A/4.2V (50mA current taper)
 - ❖ Discharge: 1A with 10A/10s pulses to 2.5V
- Ambient Temperature: 23°C

Constant Current Discharge Ratemap



- ❖ Charge: CCCV 4.2A/4.2V (50mA current taper)
- ❖ Discharge: Constant Current to 2.5V
- Ambient Temperature: 23°C

Constant Current Discharge Ratemap

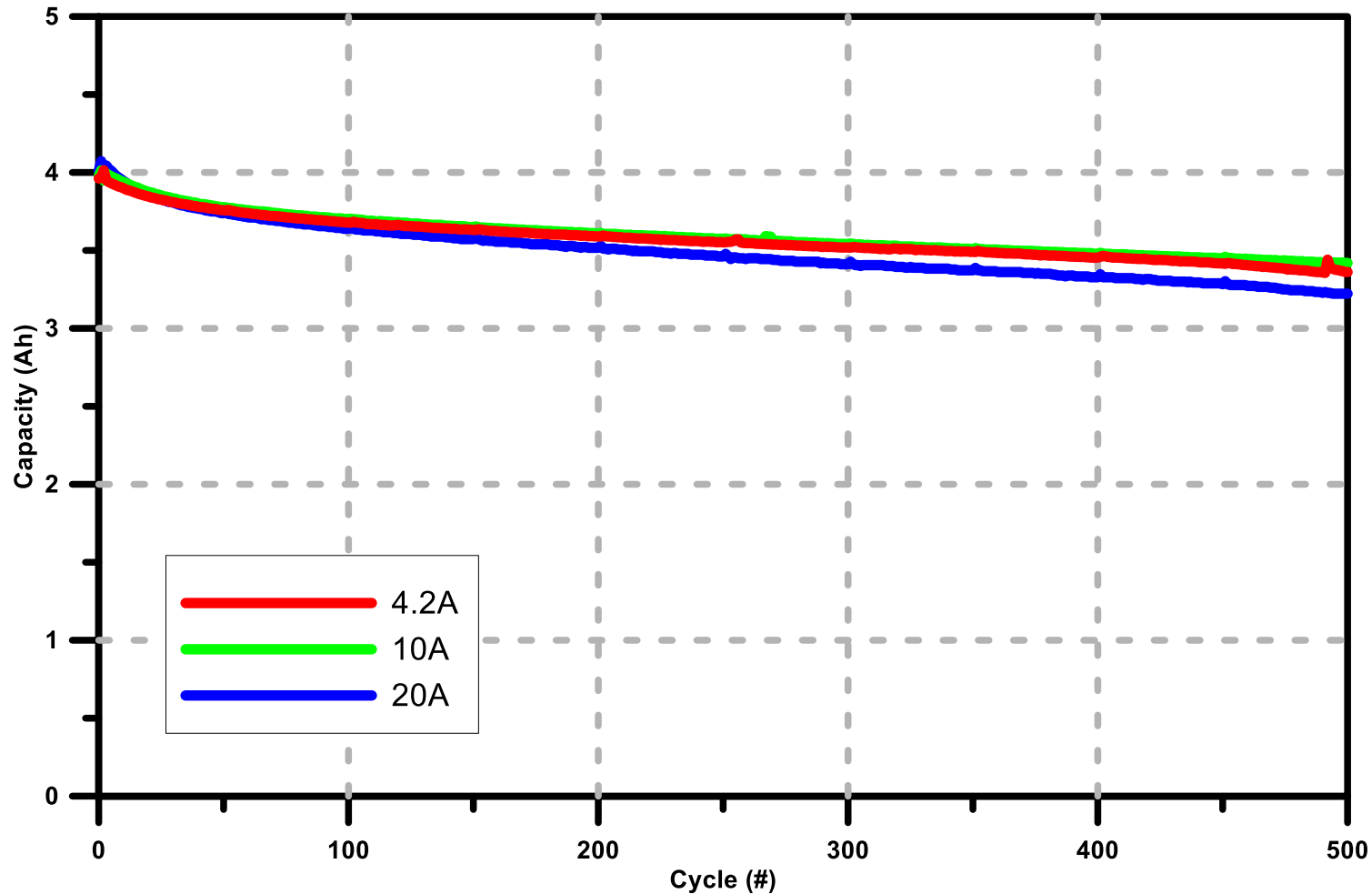


- ❖ Charge: CCCV 4.2A/4.2V (50mA current taper)
- ❖ Discharge: Constant Current to 2.5V
- Ambient Temperature: 23°C

Cycle Life

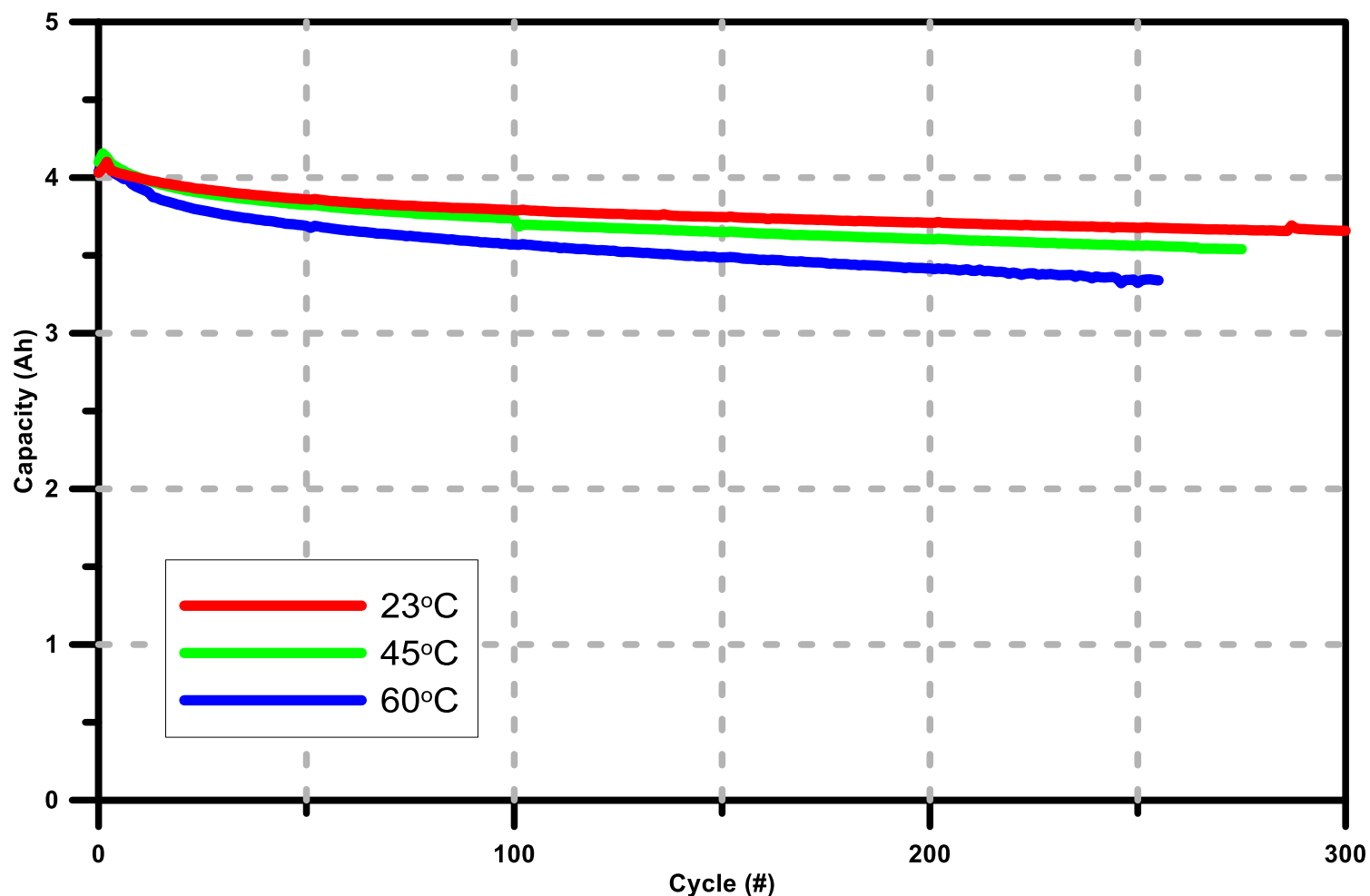


High Rate Discharge



- ❖ Charge: CCCV 4.2A/4.2V (50mA current taper)
 - ❖ Discharge: Constant Current 4.2A, 10A, or 20A to 2.5V
- Ambient Temperature: 23°C

±2A at Various Temperatures

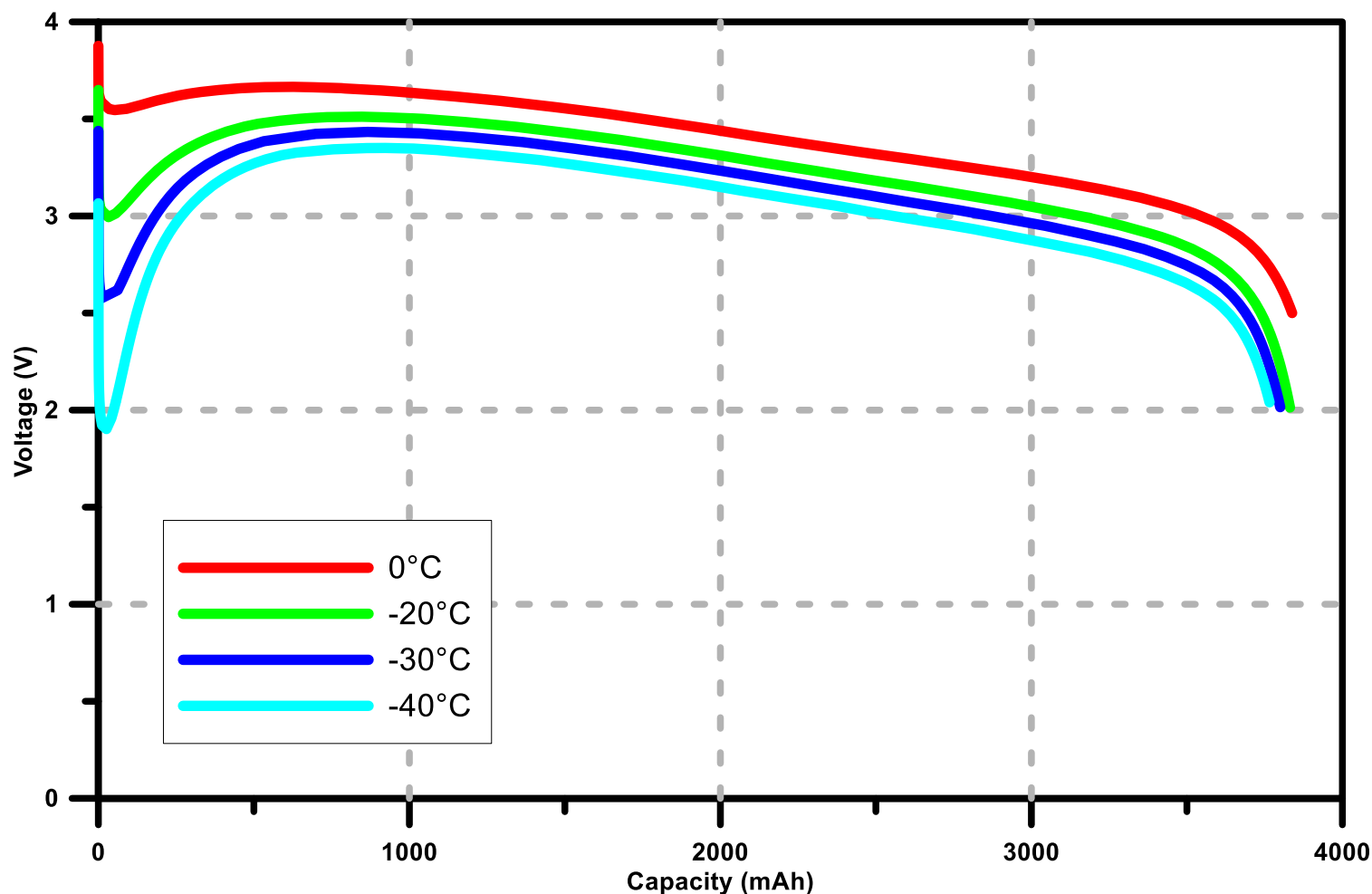


- ❖ Charge: CCCV 2A/4.2V (50mA current taper)
- ❖ Discharge: Constant Current 2A to 2.5V
- Ambient Temperature: 23°C, 45°C, and 60°C

Low Temperature Performance

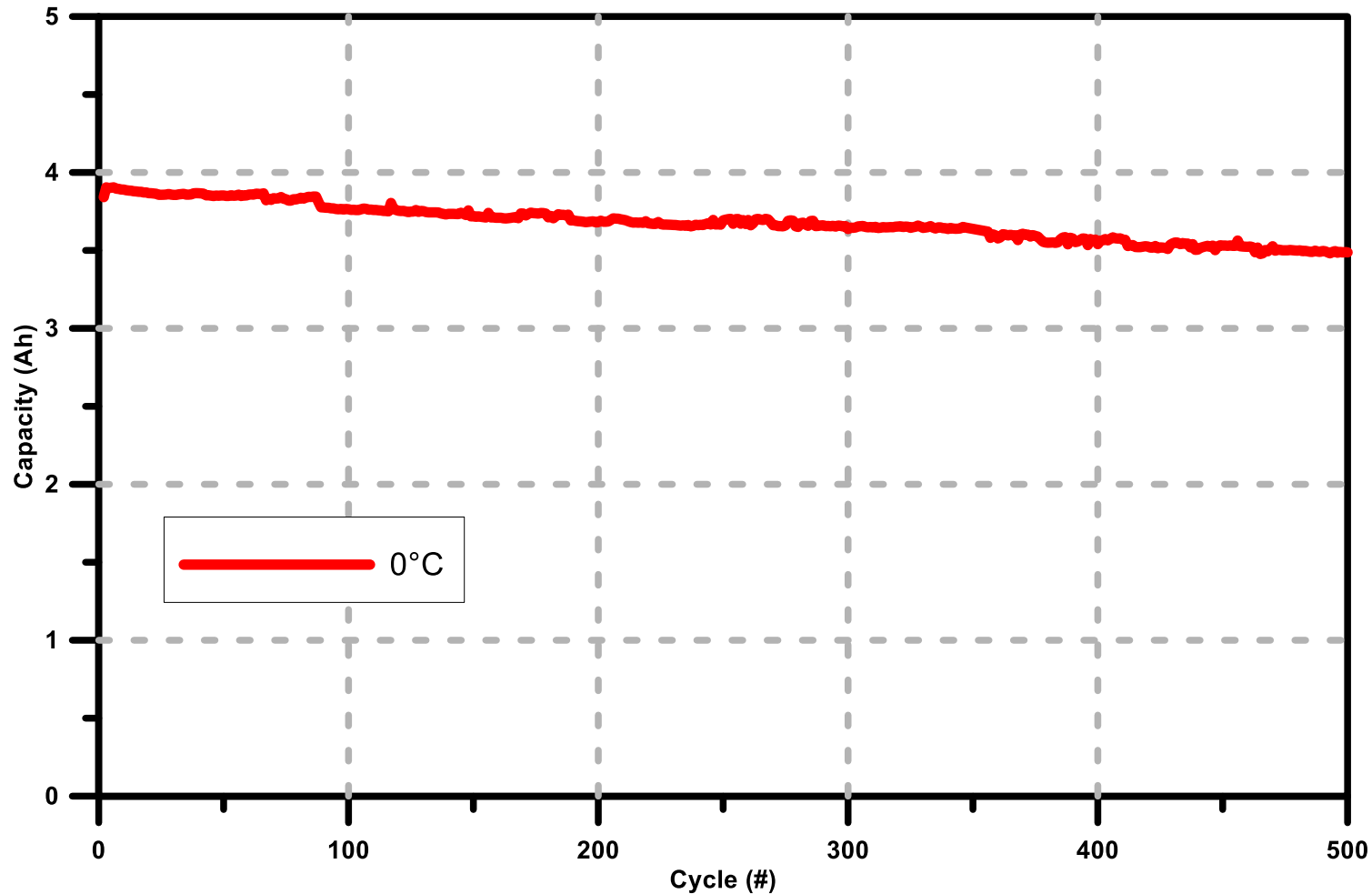


Low Temperature Rate Map



- ❖ Charge: CCCV 4.2A/4.2V (50mA current taper)
- ❖ Discharge: Constant Current at 10A to 2.5V
- Ambient Temperature: 0 °C, -20 °C, -30 °C, and -40 °C

Low Temperature Cycle Life

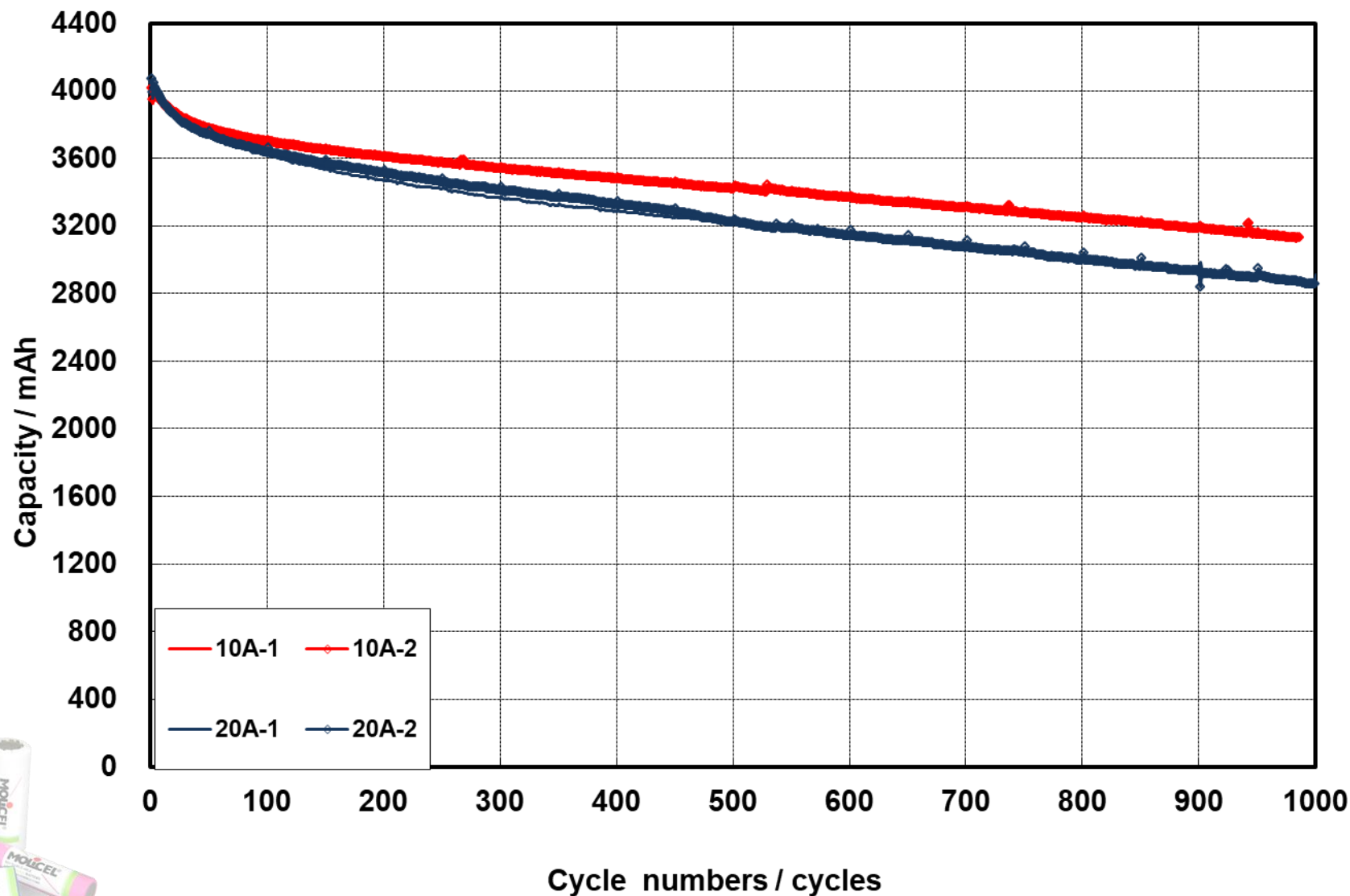


- ❖ Charge: CCCV 2A/4.2V (50mA current taper)
- ❖ Discharge: Constant Current 2A to 2.5V
- Ambient Temperature: 0°C



High Rate Cycling: 1C charge/10A & 20A Discharge

23°C +4.2A,-10A,20A,4.2V~2.5V Cycling Capacity



Safety Data



| Test | Condition | Result | Typical Max Temperature |
|--------------------------------|--------------------------|--------|-------------------------|
| Hotbox | 4.2V, 130 ° C (UL) | Pass | 132 ° C |
| Short Circuit | 50 mΩ, 23 ° C | Pass | 101 ° C |
| | 32 mΩ, 23 ° C | Pass | 132 ° C |
| | 5 mΩ, 60 ° C | Pass | 77 ° C |
| Overcharge 23 ° C, 100% DOD | 4.2A, 15 V, Insulated | Pass | 71 ° C |
| | 9A,15 V (UL) | Pass | 74 ° C |
| Flat Plate Crush | 4.2V, 23 ° C, 13 kN (UL) | Pass | 26 ° C |
| Impact | 4.2V, 23 ° C (UL) | Pass | 44 ° C |



Safety Data

| Cell no. | ACR/mΩ | OCV/V | Photo after testing | Results |
|----------|--------|-------|--|--|
| 1 | 8.85 | 4.17 |  | Pass Can no crack |
| 2 | 8.74 | 4.17 |  | Pass Can no crack |
| 3 | 8.81 | 4.17 |  | Pass Can no crack |
| 4 | 8.68 | 4.17 |  | Pass Can no crack, J/R extrusion out. |
| 5 | 8.74 | 4.17 |  | Pass Can no crack |

Nail condition:

Nail type → SS, Ø 3mm
 Speed → 15mm/s
 Depth: 3mm
 Position → center of cell



Storage



100% SOC, 28 Day Storage

| Design | Storage | Capacity | | ACZ | | |
|---------------|-------------|----------|-----------|--------|-------|--------|
| | Temperature | Retained | Recovered | Before | After | Change |
| | °C | % | % | mΩ | mΩ | % |
| INR-21700-P42 | 23 | 97 | 98 | 9.8 | 10.0 | 3 |
| | 60 | 89 | 95 | 9.7 | 10.6 | 9 |

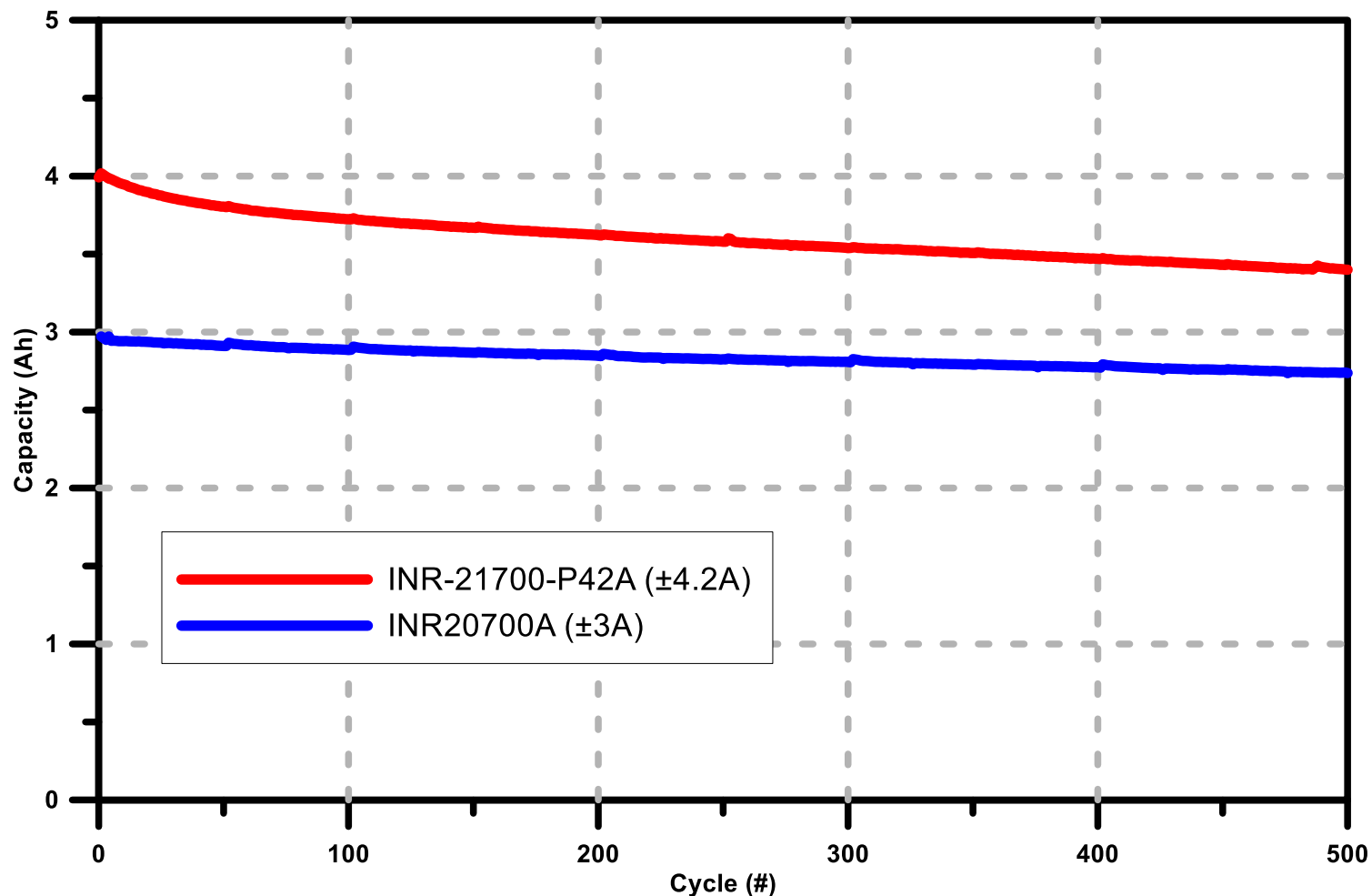
❖ Typical values shown.



Comparative Data

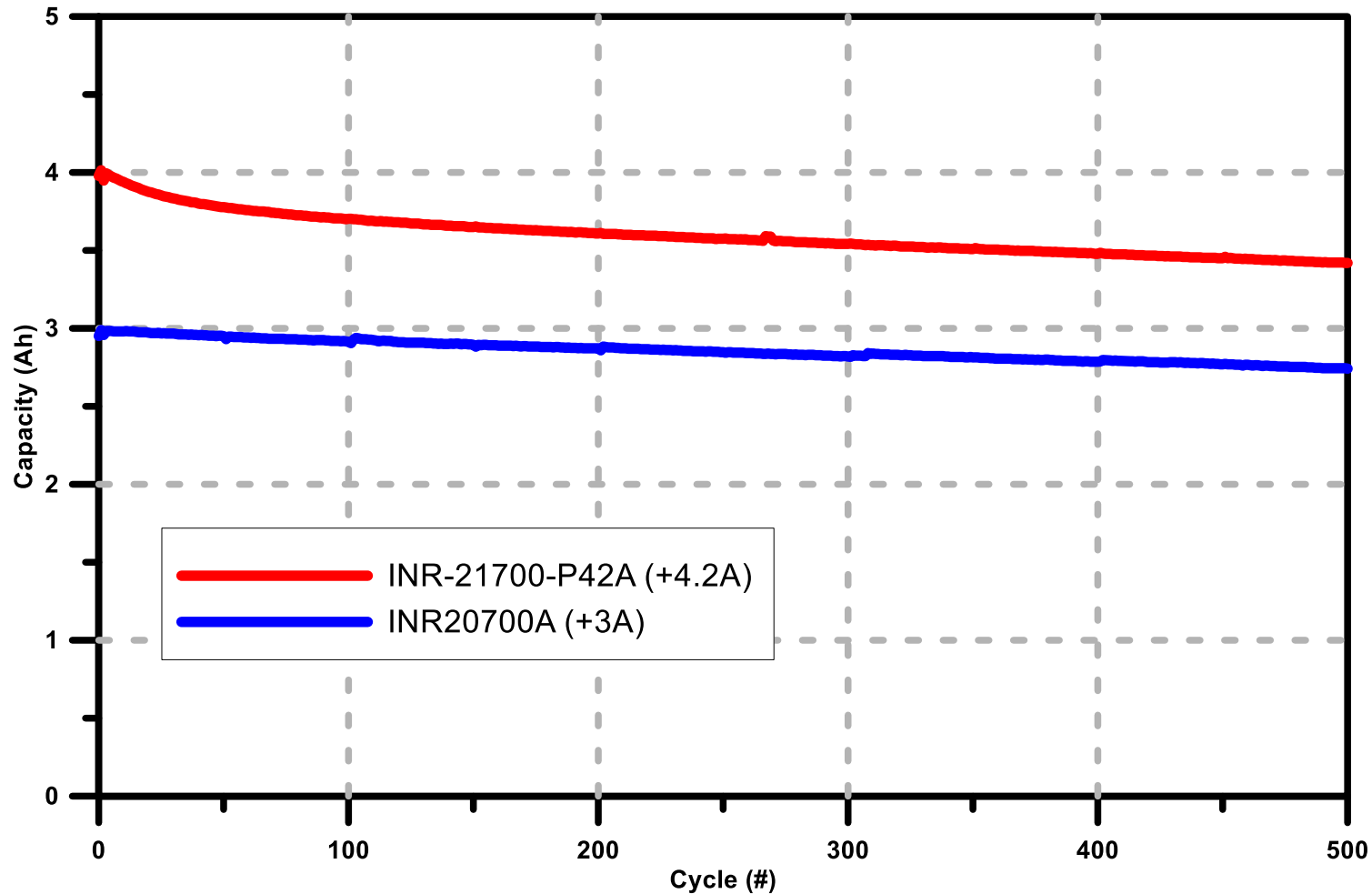


23°C, 1C Cycling Life Comparison



- ❖ Charge: CCCV 1C/4.2V (50mA current taper)
 - ❖ Discharge: Constant Current 1C to 2.5V
- Ambient Temperature: 23°C

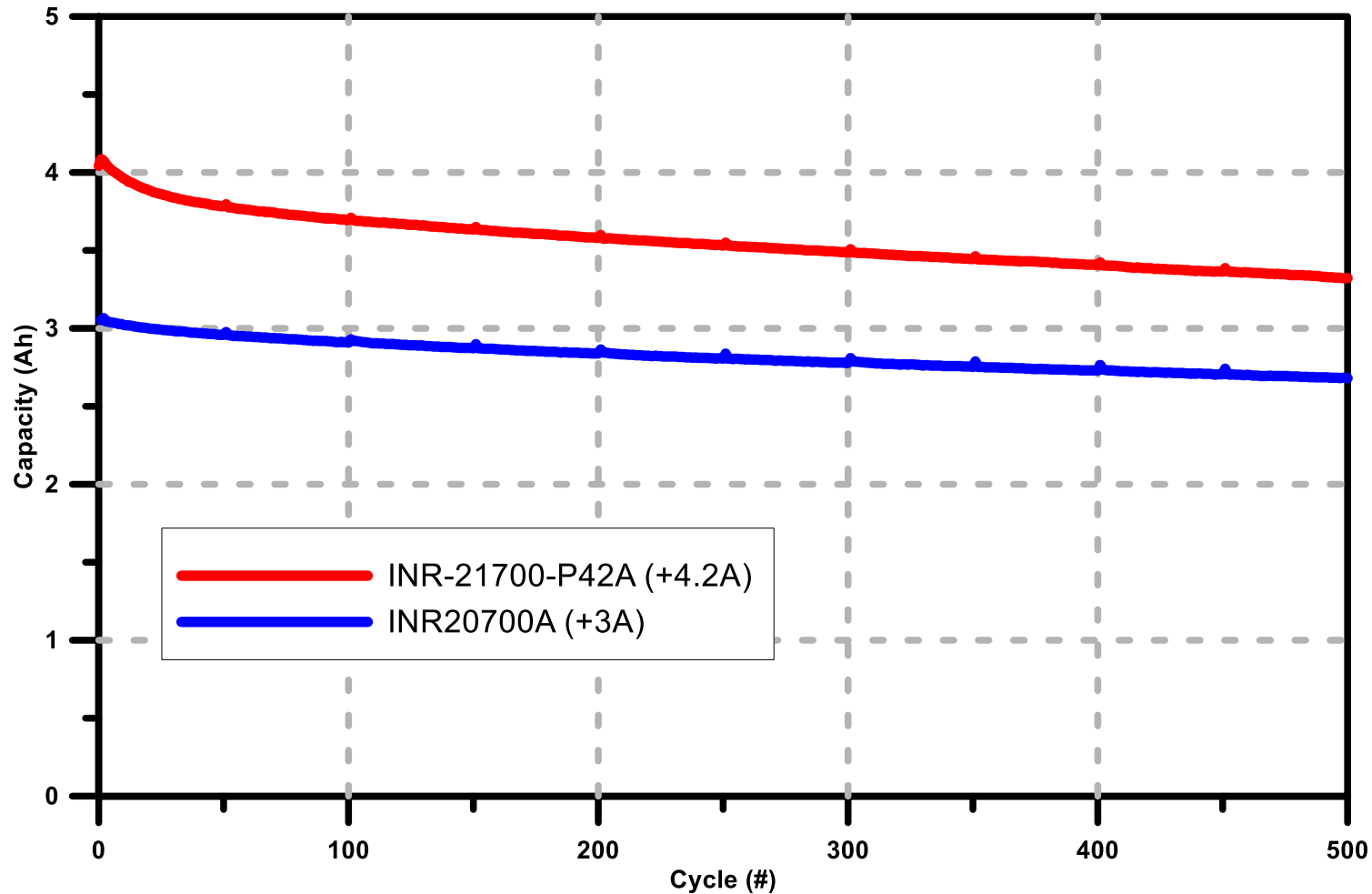
23°C, 10A Discharge Cycling Comparison



- ❖ Charge: CCCV 1C/4.2V (50mA current taper)
 - ❖ Discharge: Constant Current at 10A to 2.5V
- Ambient Temperature: 23°C



45°C, 10A Discharge Cycling Comparison



- ❖ Charge: CCCV 1C/4.2V (50mA current taper)
 - ❖ Discharge: Constant Current 10A to 2.5V
- Ambient Temperature: 45°C

Thank you for your attention

