

Proposal for ICR18650-26H

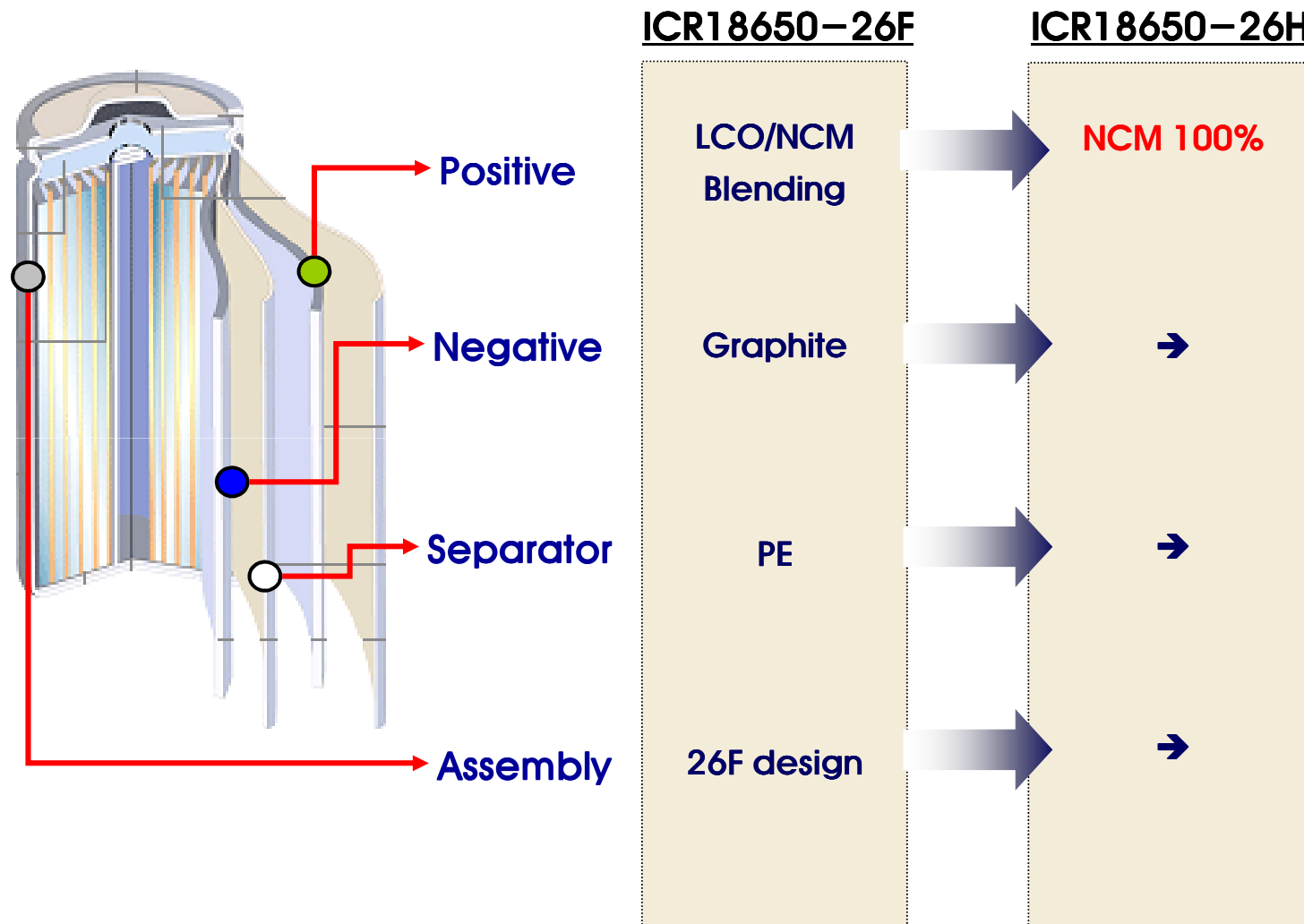
August '2011

Battery Business Division
SAMSUNG SDI

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Design concept



Advantage of ICR18650-26H

1. Cost Merit

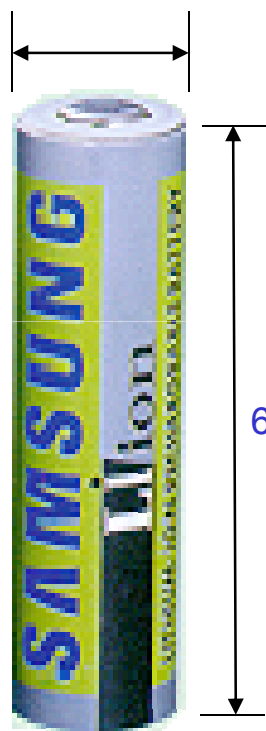
→ **Cost reduction & sensibility mitigation against raw material cost fluctuation**

2. High rate characteristics

→ **At high C-rate discharge, 26H discharge more capacity than 26F**

General Spec. of ICR18650-26H

Φ max 18.4 mm



Max 65.0mm

With Tube

		ICR18650-26F	ICR18650-26H
● Capacity	Nominal Minimum	2,600mAh 2,550mAh	2,650mAh 2,600mAh
● Nominal Voltage		3.70V	3.63V
● Charging Method		CC-CV	←
● Charging Voltage		4.20V	←
● Charging Current	Standard Rapid	1.30A 2.60A	←
● Discharging Cut-off Voltage		2.75V	←
● Discharging Current	Max.	5.2A	←
● Weight	Max.	47g	←
● Operating Temperature	Charge Discharge	0 ~ 45 °C -20 ~ 60 °C	←
● Storage Temperature	1 Year 3 Months 1 Month	-20 ~ 25 °C -20 ~ 45 °C -20 ~ 60 °C	←

@ *Reliability*

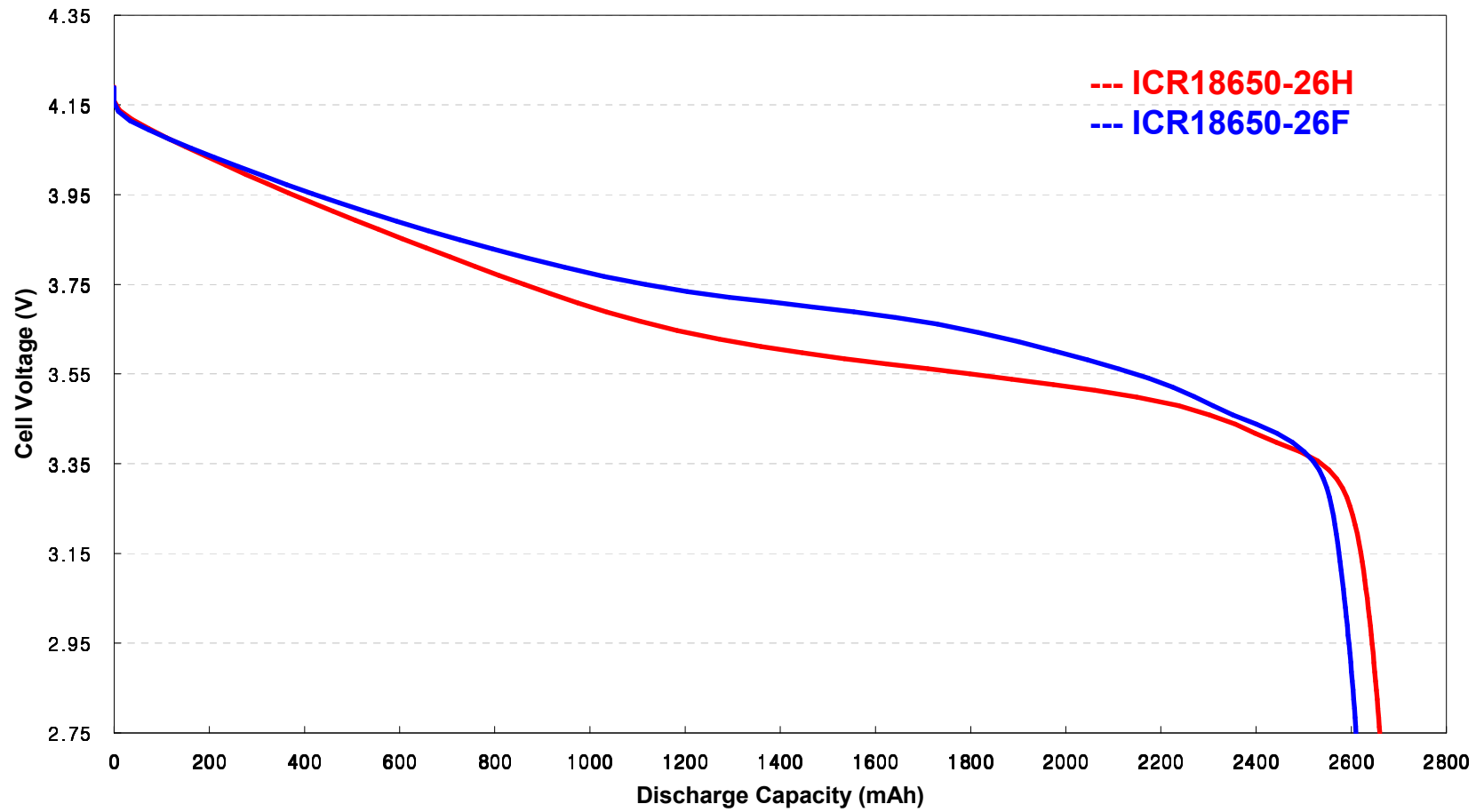
Standard discharge profile

Model : ICR18650-26H

Test Method : Charge - CC/CV 0.5C/4.2V 3hr or 20mA cut-off at 25°C

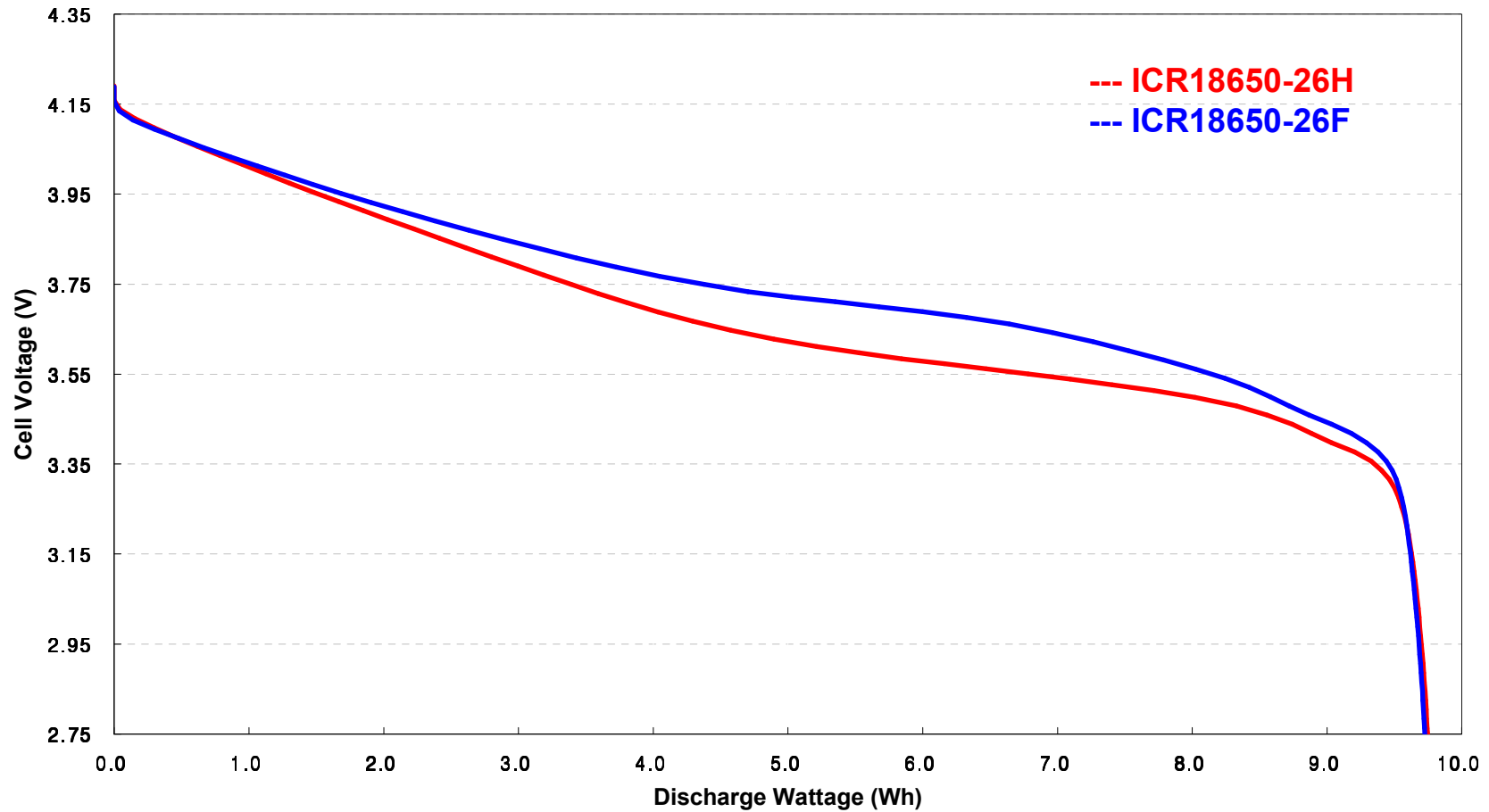
Discharge - CC 0.2C 2.75V cut-off at 25°C

1C=2600mA



Standard discharge profile

Model : ICR18650-26H
Test Method : Charge - CC/CV 0.5C/4.2V 3hr or 20mA cut-off at 25°C
Discharge - CC 0.2C 2.75V cut-off at 25°C
1C=2600mA



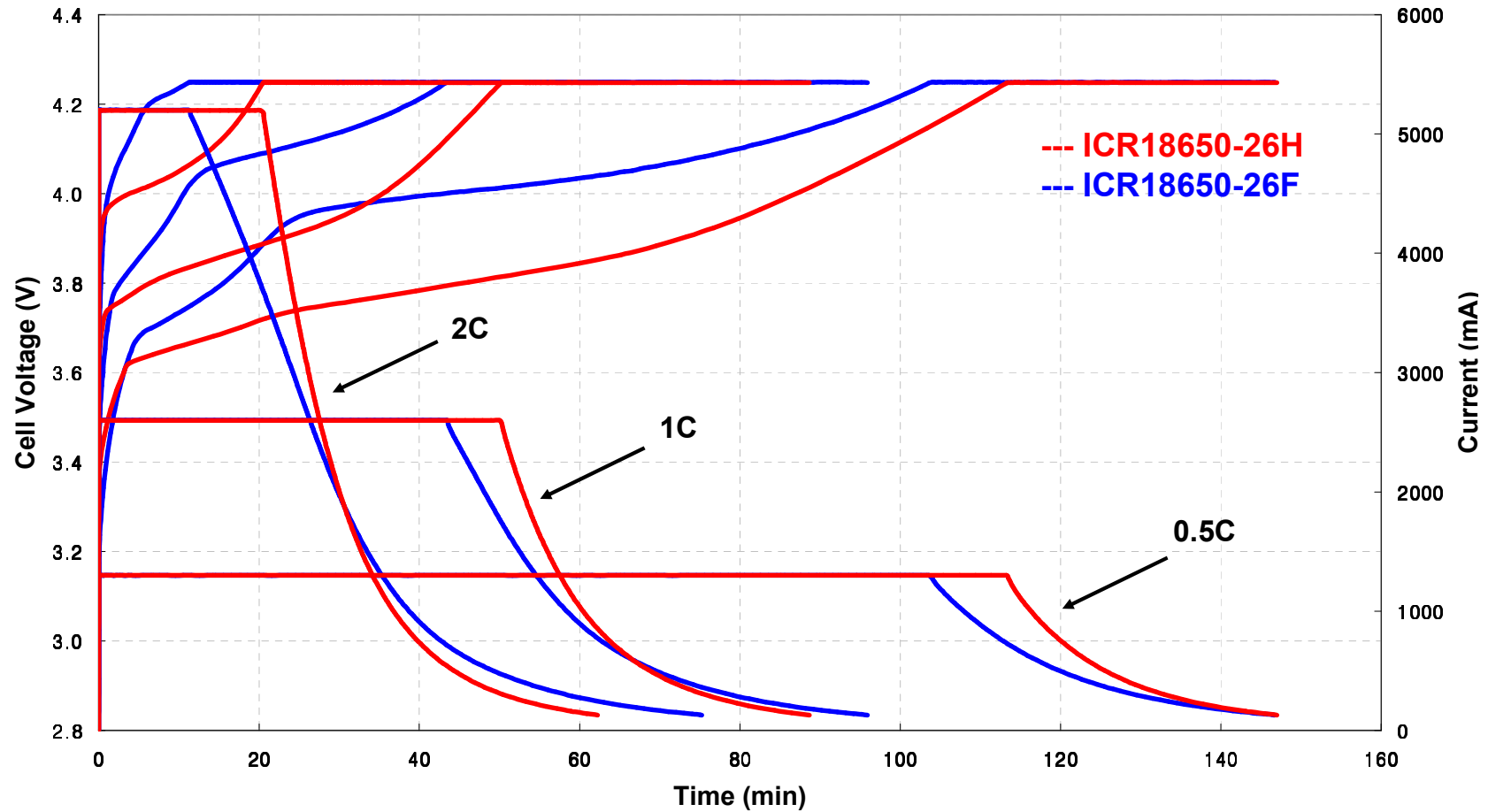
Rate charge profile

Model : ICR18650-26H

Test Method : Charge - CC/CV 0.5C, 1.0C, 2C/ 4.2V 130mA cut-off at 25 °C

Discharge - CC 0.2C 2.75V cut-off at 25 °C

1C=2600mA



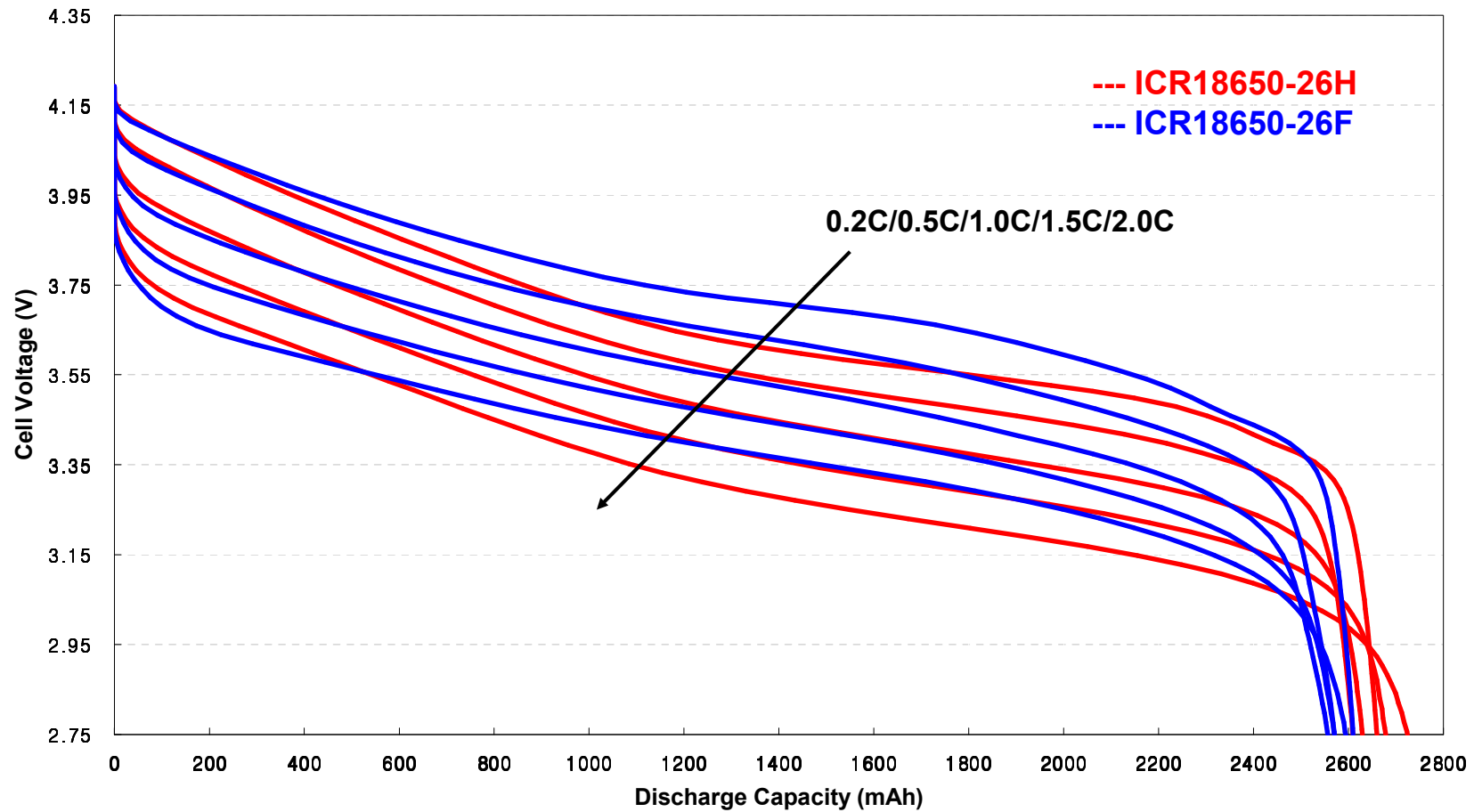
Rate discharge profile

Model : ICR18650-26H

Test Method : Charge - CC/CV 0.5C/4.2V 3hr or 20mA cut-off at 25°C

Discharge - CC 0.2C, 0.5C, 1.0C, 1.5C, 2C / 2.75V cut-off at 25°C

1C=2600mA



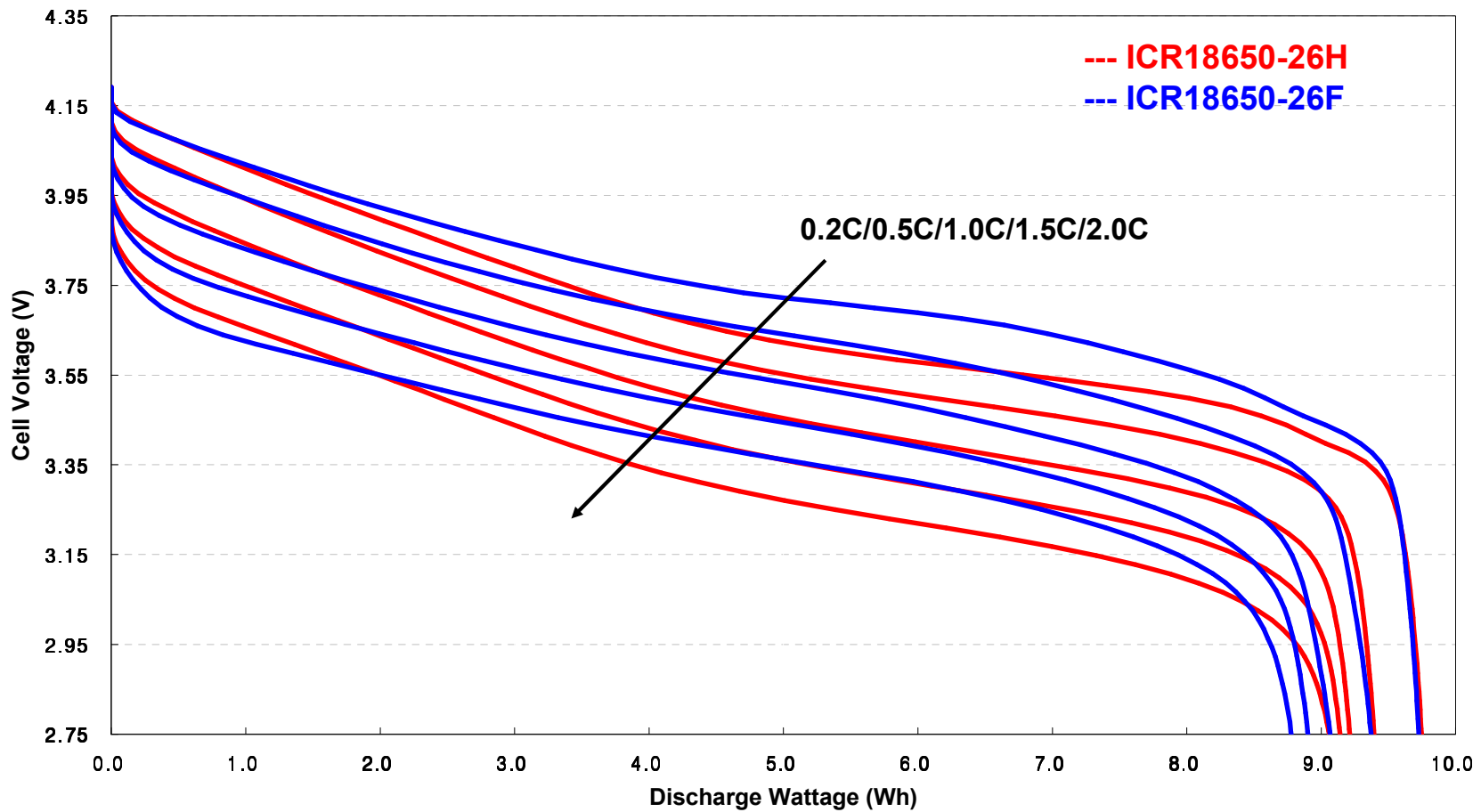
Rate discharge profile

Model : ICR18650-26H

Test Method : Charge - CC/CV 0.5C/4.2V 3hr or 20mA cut-off at 25°C

Discharge - CC 0.2C, 0.5C, 1.0C, 1.5C, 2C / 2.75V cut-off at 25°C

1C=2600mA



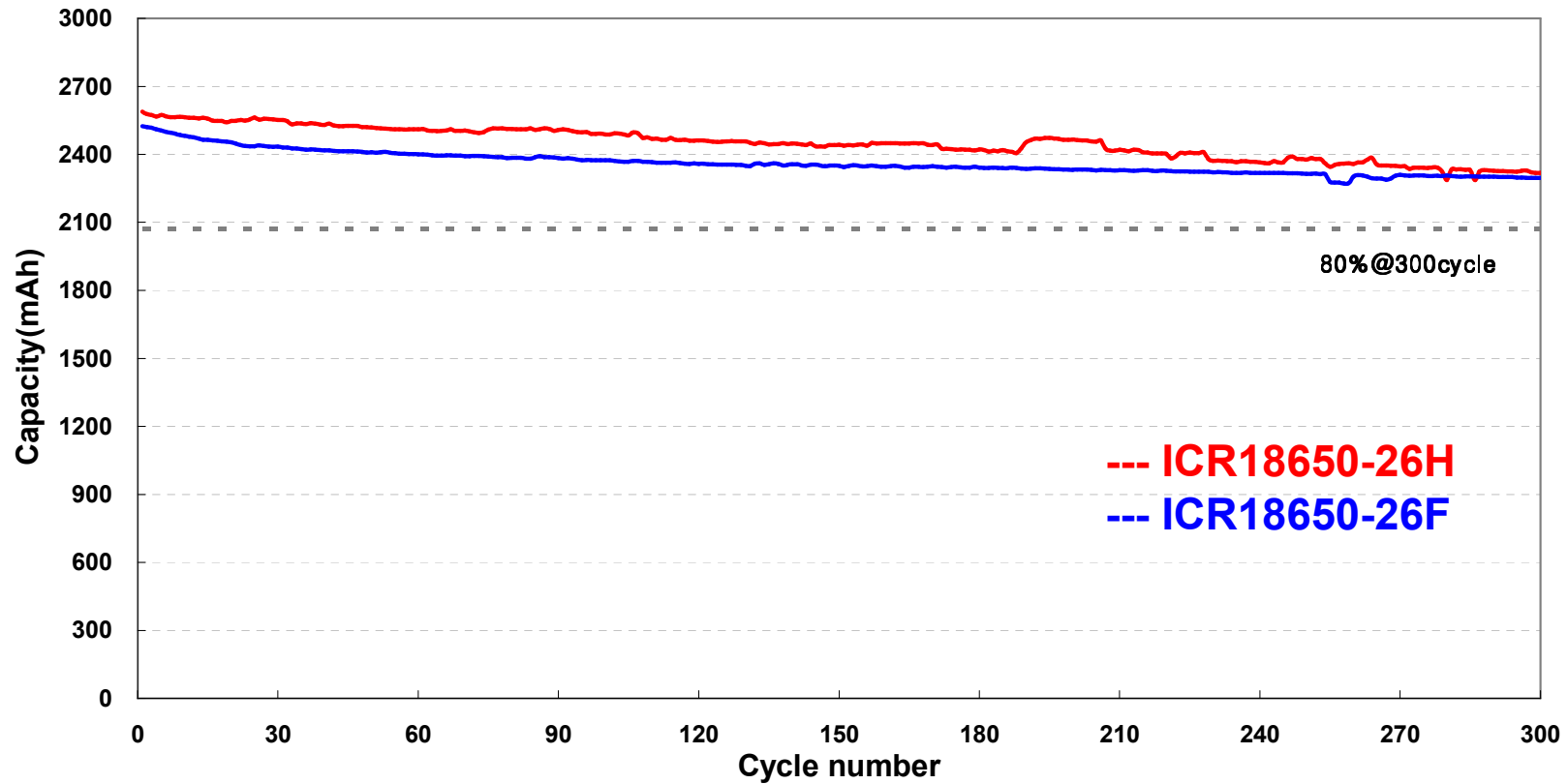
Cycle life (25 °C)

Model : ICR18650-26H

Method : Charge : CC-CV 0.8C 4.2V 130mA cut off at 25 °C

Discharge : CC 1.0C 3.0V cut off at 25 °C

1C=2600mA



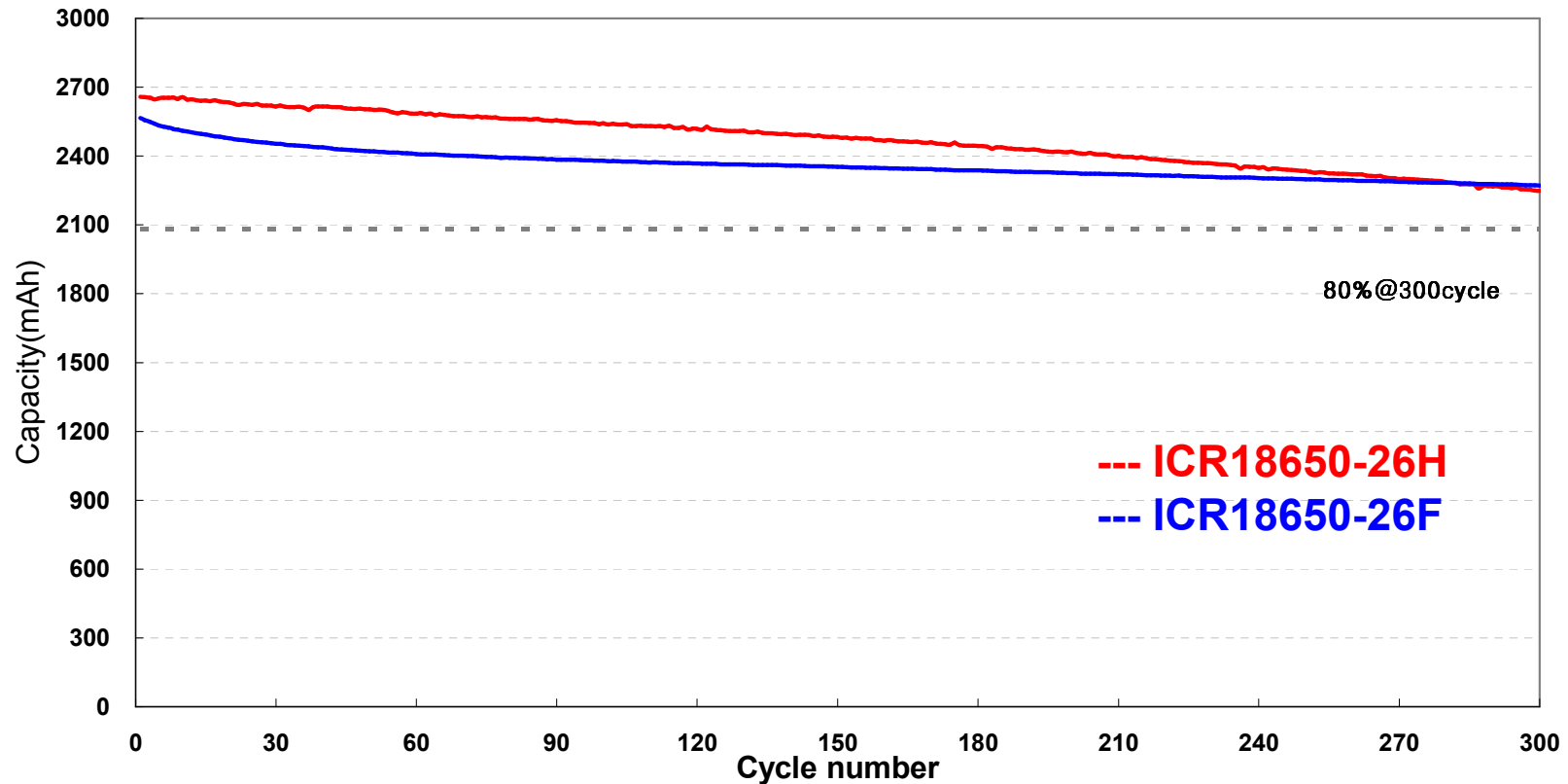
Cycle life (45 °C)

Model : ICR18650-26H

Method : Charge : CC-CV 0.8C 4.2V 130mA cut off at 45 °C

Discharge : CC 1.0C 3.0V cut off at 45 °C

1C=2600mA



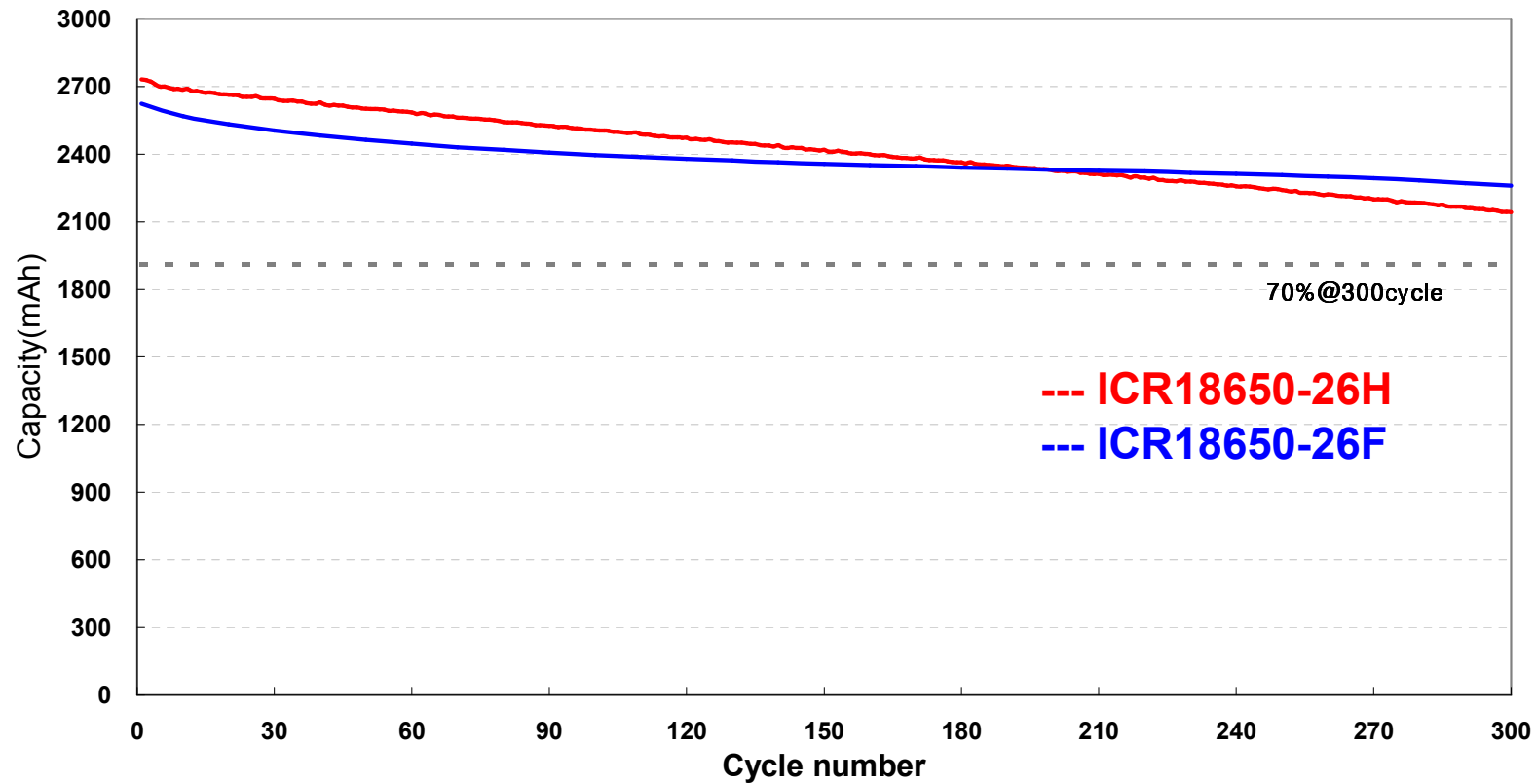
Cycle life (60 °C)

Model : ICR18650-26H

Method : Charge : CC-CV 0.8C 4.2V 130mA cut off at 60 °C

Discharge : CC 1.0C 3.0V cut off at 60 °C

1C=2600mA



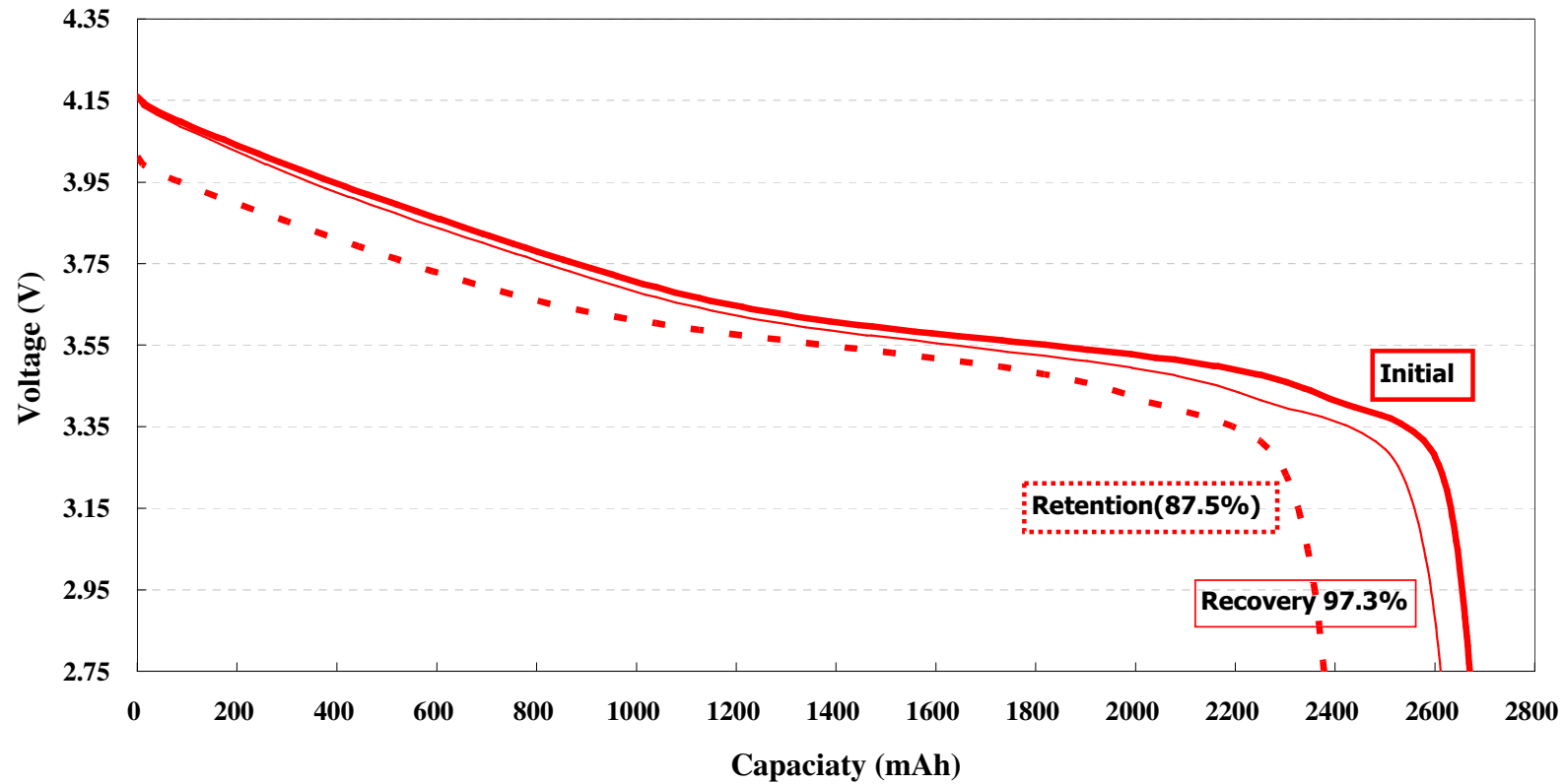
Storage characteristics at 60°C for 1month

Model : ICR18650-26H

Test Method : Charge - 0.5C, 4.2V 20mA or 3Hr cut-off

Discharge - 0.2C, 2.75V cut-off

1C=2600mA



@ Safety

Safety test results

▶ **Electrical Abuse**

- External Short (25°C)
- External Short (60°C)
- Overcharge at 1C
- Overcharge at 2C
- Overcharge at 3C

▶ **Mechanical Abuse**

- Crush
- Impact

▶ **Thermal Abuse**

- Hot Oven at 150°C

Level 0
Level 0
Level 0
Level 0
Level 0

Level 1
Level 1

> 10min.

n= 3, all Level 0
n= 3, all Level 0
n= 3, all Level 0
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n= 3, all Level 0
n= 3, all Level 0

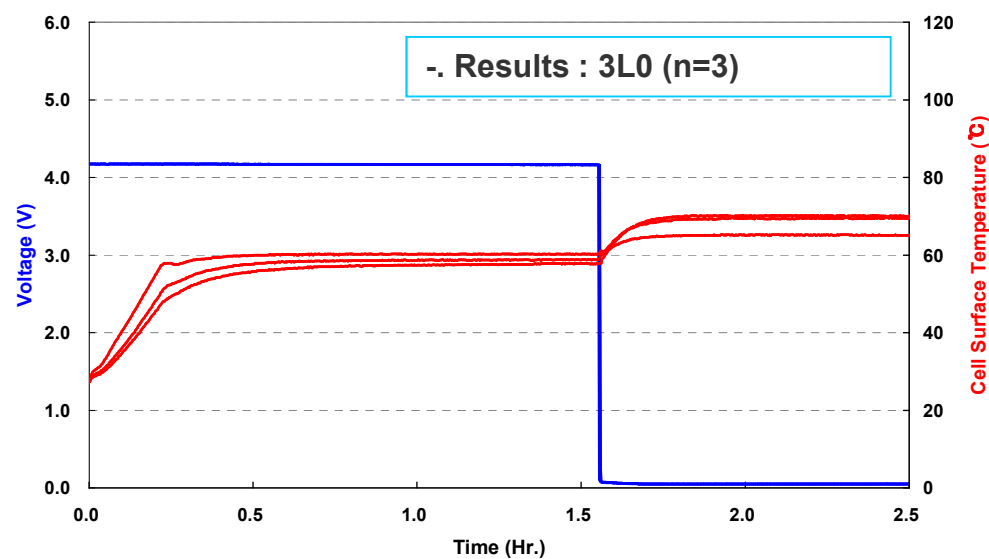
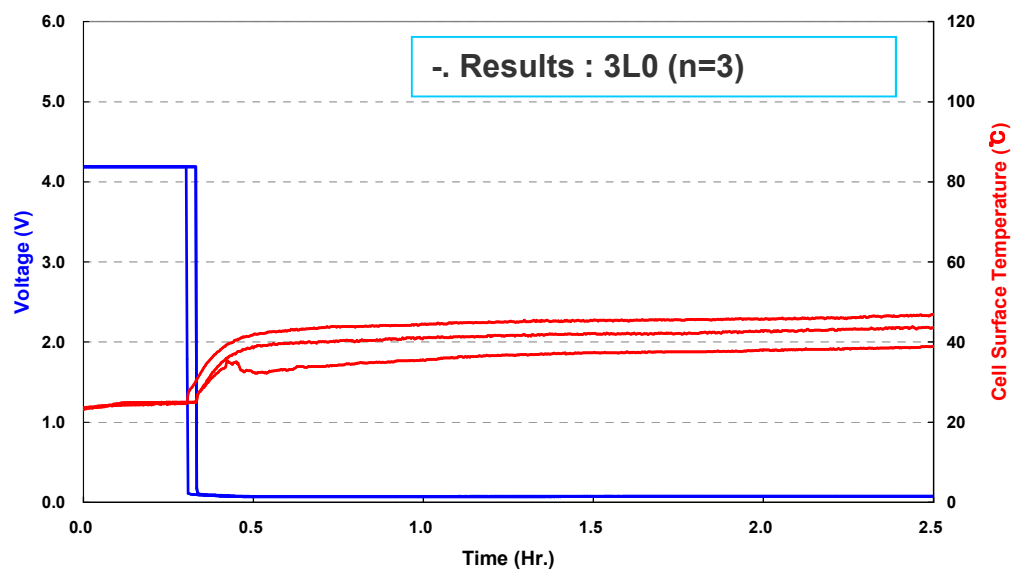
n= 3, all Level 1

Level	L0	L1	L2	L3	L4	L5
Criteria	No Change	Leak	Smoke,<200°C	Smoke,>200°C	Fire	Explosion

External Short

Model : ICR18650-26H

Test method : External short at 25°C and 60°C with fully charged cell



Overcharge

Model : ICR18650-26H

Test method : Charging 1C/2C/3C 12V, 2Hr/1Hr/1Hr cut off

▶ 1C 12V

→ Results : 3L0

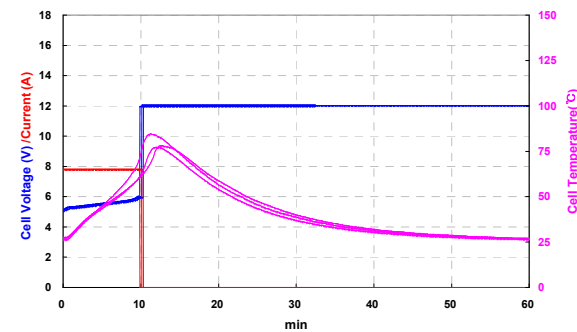
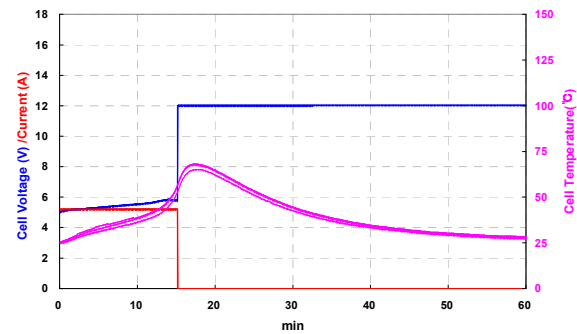
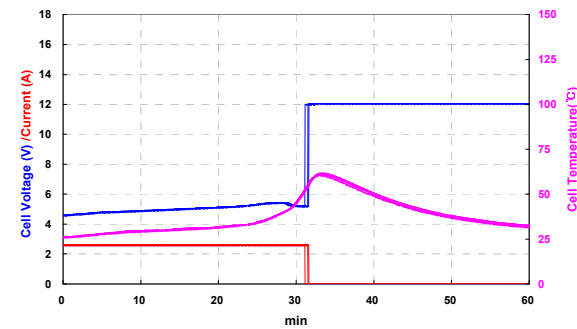
▶ 2C 12V

→ Results : 3L0

▶ 3C 12V

→ Results : 3L0

1C=2600mA



Crush & Impact

● Crush

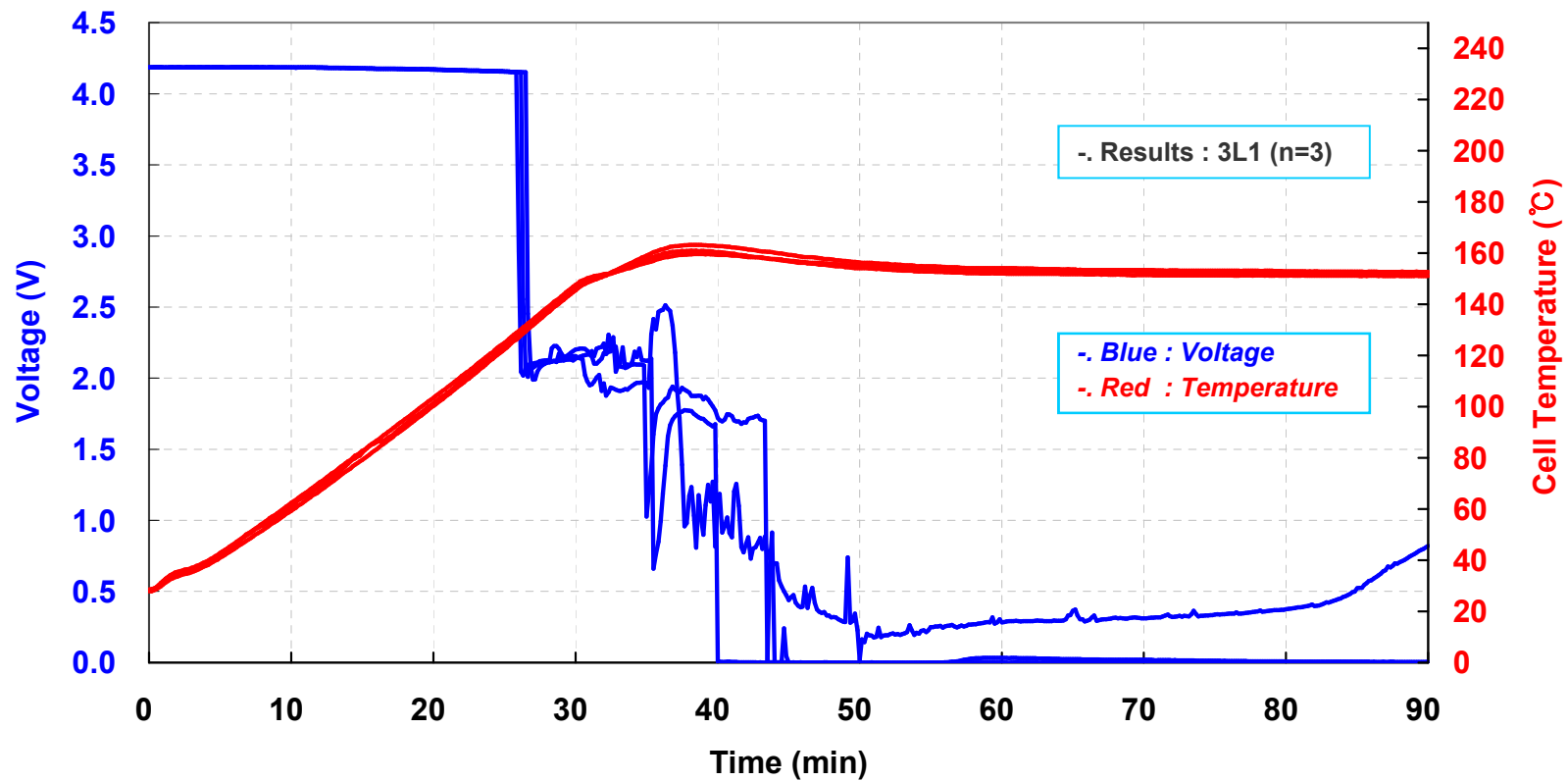
- Test method : 0.5C 4.2V 3hr Charged condition,
13KN iron plate
- No Event → 3L0

● Impact

- Test method : 0.5C 4.2V 3hr Charged condition
φ15.8mm circular rod, 9.1kg 61cm
- No Event → 3L0

Hot oven at 150°C

Test method : Heat exposure at 150°C after fully charged cell in hot oven



Proposal of Development Schedule

- Mass Production will be started in January 2012.