

STOBA PRODUCT INTRODUCTION 1



STOBA_1

Suitable for

Effectiveness

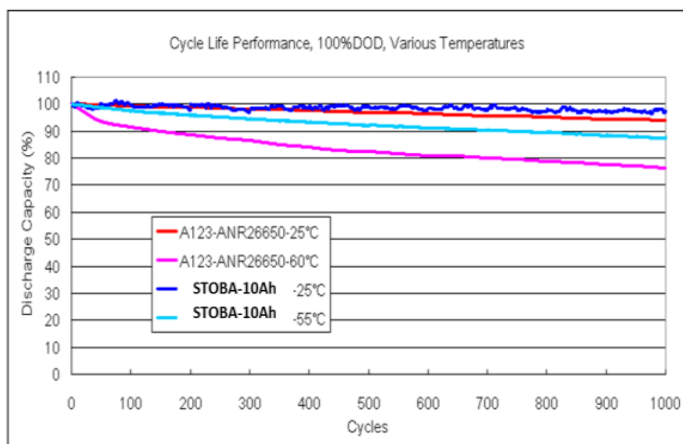
Power Li-battery
NMC111 cathode electrode

- Prevent the dissolution of transition metals on the cathode
- Inhibits the growth of Lithium Dendrite
- Throughout the nail-test, no explosion and no fire
- Make the battery resistant to high temperature and accelerate heat dissipation
- Increase the high c-rate charge and discharge capacity

STOBA_1 practical cases

With STOBA of 10Ah LNMC cell-Cycle & Nail test

Excellent cycle stability @ RT and HT by reducing metal ion deposition

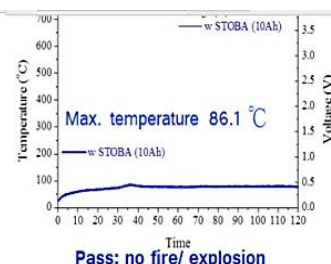
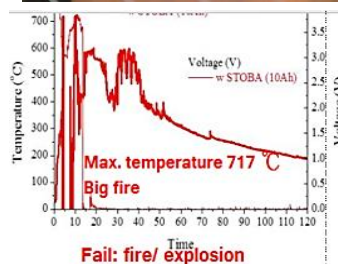
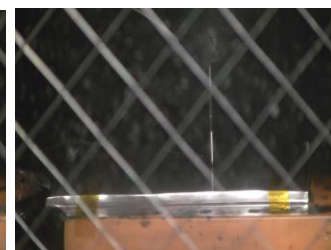


Prevent thermal runaway, when batteries suffer from damage

w/o STOBA

with STOBA

➤ Condition-O.D.: 2.5mm rate:5mm/sec



STOBA PRODUCT INTRODUCTION 2



STOBA_2

Suitable for	Effectiveness
NCA、NCM523、622、811、LCO Cathode	<ul style="list-style-type: none"> Prevent the dissolution of transition metals on the cathode Capture the dissolved transition metal in the electrolyte to reduce its flow to the anode surface. Inhibits the growth of Lithium Dendrite Throughout the nail-test, no explosion and no fire · Improve the effectiveness of various safety testing projects Make the battery resistant to high temperature and accelerate heat dissipation The modified coating method can improve the water resistance of active materials for storage
Cathode slurry additive or modified coating	

STOBA_2 practical cases



Serial #	Rated Capacity (Ah)	Rated constant current charge and discharge capacity (Ah)			Discharge capacity retention (%)			Max. surface temperature of charging cell (°C)			Exterior
		0.5C	1C	2C	0.5C / initial capacity	1C / initial capacity	2C / initial capacity	0.5C	1C	2C	
S1	42	42.3628	41.5783	34.6819	100.86%	99.00%	82.58%	/	/	/	OK
S2	42	42.3042	41.2231	34.3569	100.72%	98.15%	81.80%	/	/	/	OK
SB2	42	42.3574	41.2937	34.4431	100.85%	98.32%	82.01%	/	/	/	OK
SB3	42	42.1661	41.1637	34.5448	100.40%	98.01%	82.25%	/	/	/	OK

Serial #	Rated Capacity (Ah)	Rated discharge capacity (Ah)			Discharge capacity retention (%)			Max. surface temperature of rate discharging cell (°C)			Exterior
		0.5C	1C	3C	0.5C	1C	3C	0.5C	1C	3C	
S11	42	42.1289	41.2165	39.5982	100.31%	98.13%	94.28%	/	/	/	OK
S12	42	41.9106	40.5473	39.7428	99.79%	96.54%	94.63%	/	/	/	OK
SB4	42	42.3360	41.4001	39.3953	100.80%	98.57%	93.80%	/	/	/	OK
SB5	42	40.8718	41.9761	40.5353	97.31%	99.94%	96.51%	/	/	/	OK

Serial #	Production Batch	Cycles	Cycle Performance	Date		Capacity Retention	Energy Retention
				Start Date	Update Date		
S17	TW-1-42Ah	524	1C充/1C放	2019/5/21	2019/8/5	98.1%	98.4%
SB4	TW-2-42Ah	534	1C充/1C放	2019/5/21	2019/8/5	97.2%	98.2%

STOBA_3

Suitable for

NMC622, 811 and other high-nickel cathode electrode

LCO and other Cathode slurry additive or modified coating

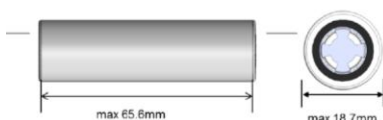
Effectiveness

- Prevent the dissolution of transition metals on the cathode
- Capture the dissolved transition metal in the electrolyte to reduce its flow to the anode surface
- Inhibits the growth of Lithium Dendrite
- Inhibits the formation of moisture inside the battery
- Effectively improve battery safety and battery cycle life
- Improved battery temperature tolerance
- Homogenize the electrode material and improve battery consistency
- The modified coating method can improve the water resistance of active materials for storage

STOBA_3 practical cases

INR18650E-32

【Cell Design】

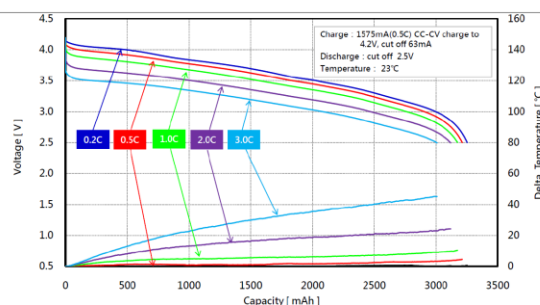


Model		INR18650E-32
Nominal Capacity		3,250 mAh
Voltage	Charge	4.20 V
	Average	3.60 V
	Cut off	2.50 V
Dimensions	Diameter	<18.70 mm
	Height	<65.60 mm
Cell Weight		< 50.0 g

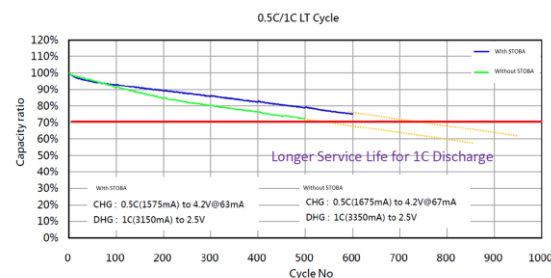
【General Specification】

Capacity	Nominal	3,250 mAh
	Minimum	3,150 mAh
Discharge Current	Standard	1,575 mA
	Maximum	6,300 mA
Charge Current	Standard	1,575 mA
	Maximum	3,150 mA
Energy Density	Gravimetric	234 Wh/kg
	Volumetric	650 Wh/L
AC-Impedance		< 50 mΩ
Discharge Rate Capability (Cut off 2.5V)	0.5C	97 %
	1.0C	95 %
	2.0C	90 %
Cycle Life		0.5C/1C, 70% 4.2V-2.5V > 500 Cycle

Discharge Characteristics



Cycle Life Performance



STOBA_5 (booster)

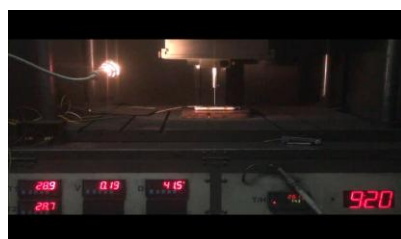
Suitable for	Effectiveness
Combined with electrolyte, as a booster	<ul style="list-style-type: none"> This product is used with the existing STOBA of the positive electrode to enhance the safety effect Capture the dissolved transition metal in the electrolyte to reduce its flow to the anode surface Inhibits the growth of Lithium Dendrite Effectively improve battery safety and battery cycle life, Improved battery safety, including : Hotbox 150°C and Nail test Improved battery temperature tolerance
All kinds of lithium ternary NMC523, 622, 811, lithium cobalt oxide LCO, etc. were originally added with STOBA and with STOBA 5 electrolyte	

STOBA_5 practical cases

Nail Penetration Test of LCO (4.8Ah) Battery

Nail $\Phi=3\text{mm}$ Nail Speed= 40 mm/sec Fully Penetrated

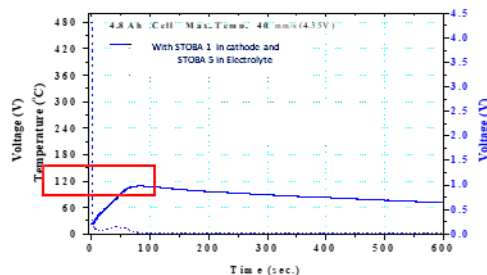
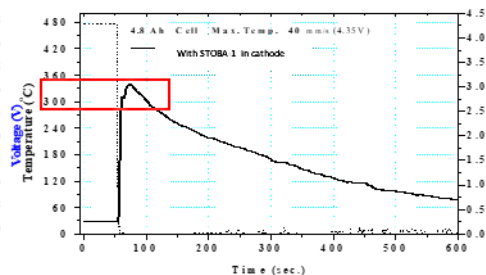
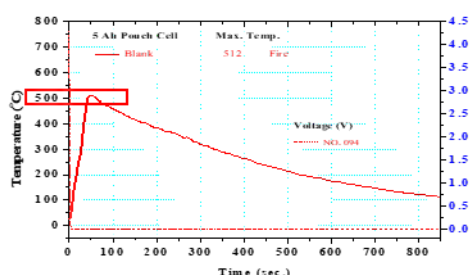
Blank



With STOBA_1 in Cathode



With STOBA_1 in Cathode
With STOBA_5 in Electrolyte(booster)



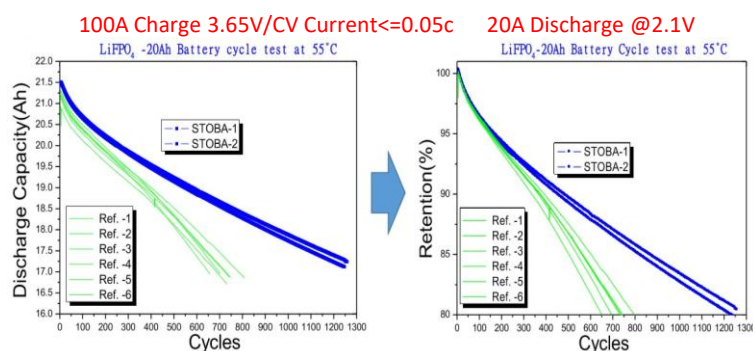


STOBA_6

Suitable for	Effectiveness
LFPO ₄ Cathode Electrode LFPO ₄ Electrolyte NMC、NCA Electrolyte	<ul style="list-style-type: none"> Prevent the dissolution of transition metals on the cathode Capture the dissolved transition metal in the electrolyte to reduce its flow to the anode surface. Increasing battery cycle life more than 30% Make the battery resistant to high temperature, accelerate heat dissipation, and perform better when stored at high temperature The internal resistance of the battery remains more stable after the cycles Effectively improve battery pack consistency

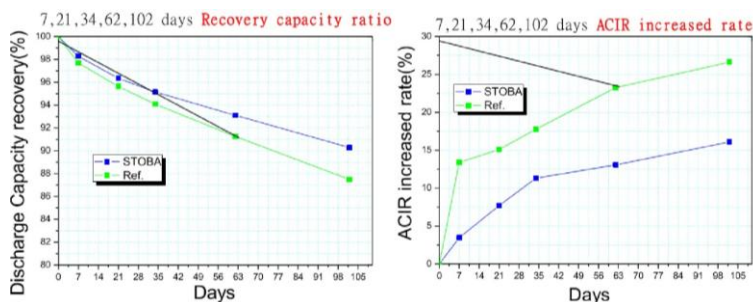
STOBA_6 practical cases

Cycle Life test of 20Ah LFPO battery at 55°C



STOBA battery shows better cycle life than Ref. battery

20Ah 100% SOC Calendar life test at 55°C



55°C Aging Recovery capacity : STOBA > Ref.

55°C Aging ACIR increased rate: STOBA < Ref.