BOOMRUN®

SUPHIP® 灼克®

浙江葆润应用材料有限公司

材 料 创 新 赋 能 热 失 控 安 全

Material Innovation Empowers Thermal Runaway Safety

SUPHIP ®Introduction

BOOMRUN SUPHIP ® The series of inorganic fiber nanocomposite insulation materials, as an innovative thermal barrier material, mainly consists of ultra-fine porous nano insulation powder. It uses special inorganic fibers as carriers and is designed with a special formula to isolate heat in three dimensions: heat conduction, radiation, and convection. The thermal conductivity is low at high temperatures. When the battery cell loses control, it can greatly block the diffusion of insulation, providing a cost-effective solution for power and energy storage batteries with a full lifecycle thermal runaway material.

- Low thermal conductivity
  Excellent thermal conductivity performance at high temperatures
- Excellent fire resistance, with a flame penetration time of over 10 minutes at 1000 °C
- The product meets RoHS, REACH, and ELV directives
- Low cost
  High cost performance ratio

SUPHIP ® Production process

Mixing

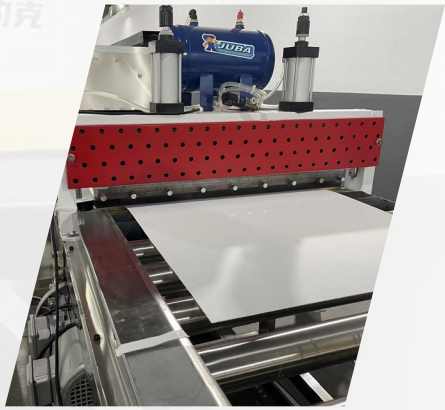
Initial formula preparation

Molding

Water filtration forms sheets

Drying

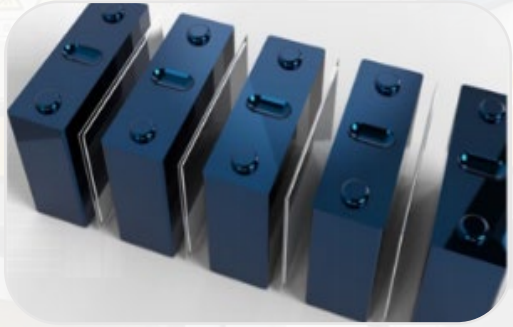
Core sheet material Drying



Cutting

Cutting machine cuts the core body

SUPHIP ®灼克 ®Application scenarios

- Protection against thermal spread between power battery cells of electric vehicles
- Thermal protection and insulation between energy storage battery cells and modules
- Thermal Protection of Aerospace Shuttle Power Systems

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SUPHIP—ZK01 Performance parameter table of core material

Characteristic	Unit	Typical value	Remarks (Testing Standards and Methods)
Physical Characteristics			
Thickness	mm	0.5-1.5	Thickness tolerance±0.1mm
Density	kg/m³	200-360	GB/T 17911-2018
Compression performance	MPa	18~25% @0.1MPa	Test with an inlet force of 0.01MPa and a compression rate of 2mm/min
		30~40% @0.5MPa	
		45~55% @1.0MPa	
Flame retardant performance			
Flame retardancy	--	V0	UL94
Electrical and thermal performance			
Leakage current	mA	≤1	Apply 2700V/mm DC voltage to both ends of the insulation plate for 60 seconds
Insulation performance	GΩ	10	ASTM D257(1000V DC，60s)
Fire resistance performance	min	10	1000°C Butane flame
Thermal conductivity coefficient	W/(m·K)	≤0.04	GB/T10295-2008（25°C）
		0.055	GB/T10294-2008（100°C）
		0.1	GB/T10294-2008（500°C）
Long term weather resistance (after packaging)			
High and low temperature test	--	pass	85 °C temperature, 85% humidity, 1000 hours
Alternating high and low temperature	--	pass	The temperature shock range is -40~85 °C, and it is maintained for 30 minutes after reaching each extreme temperature point. The temperature conversion time is based on the fastest time of the equipment. Test 500 cycles.
Prohibited and restricted substances			
ELV	--	pass	GB/T 30512-2014
RoHS	--	pass	Requirements of Appendix II to RoHS 2011/65/EU and Revised Directive (EU) 2015/863

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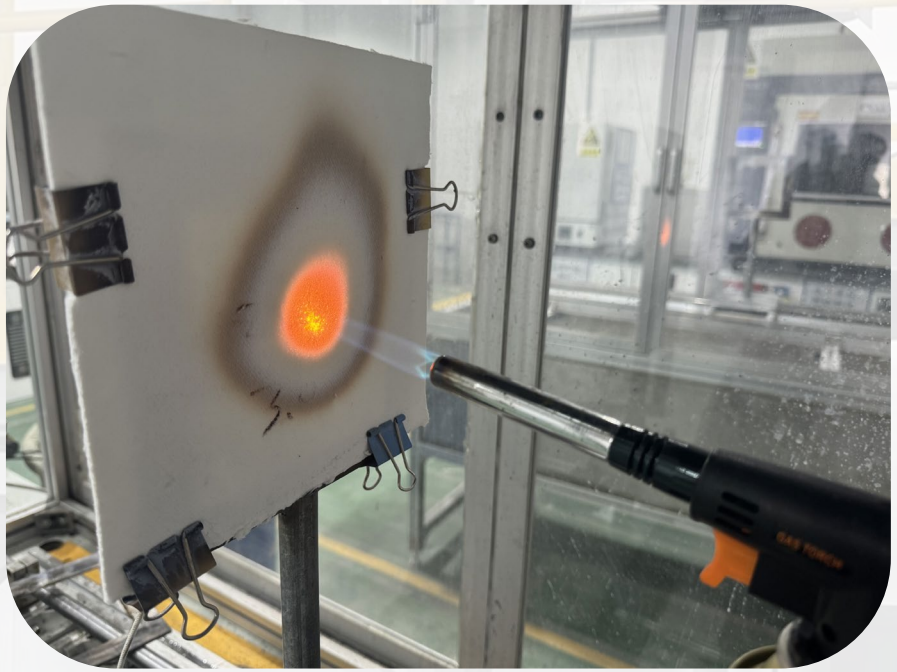
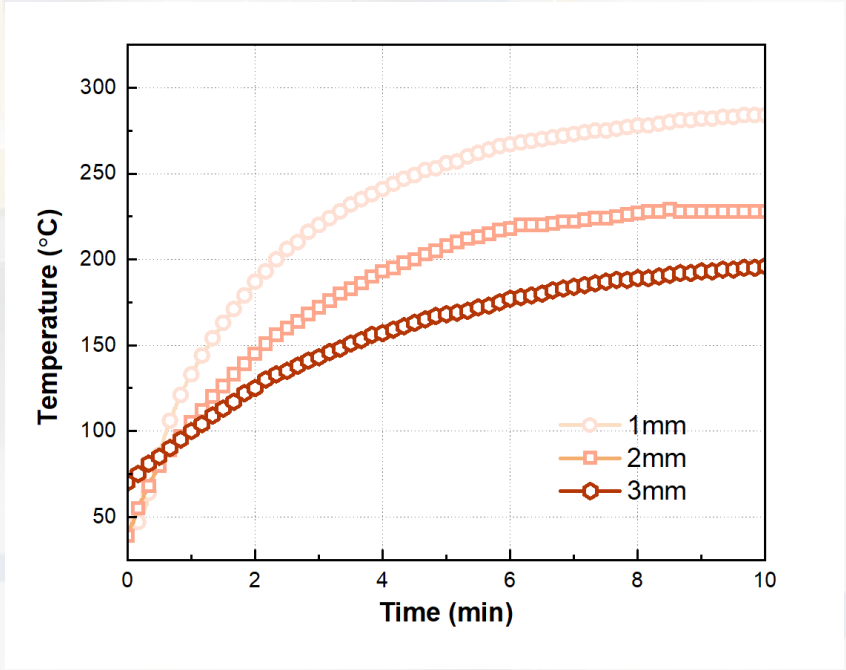
SUPHIP—ZK01 Core material testing data



Core material @ 1000 °C Fire Test



Core material cold side temperature **@** 1000°C Fire Test

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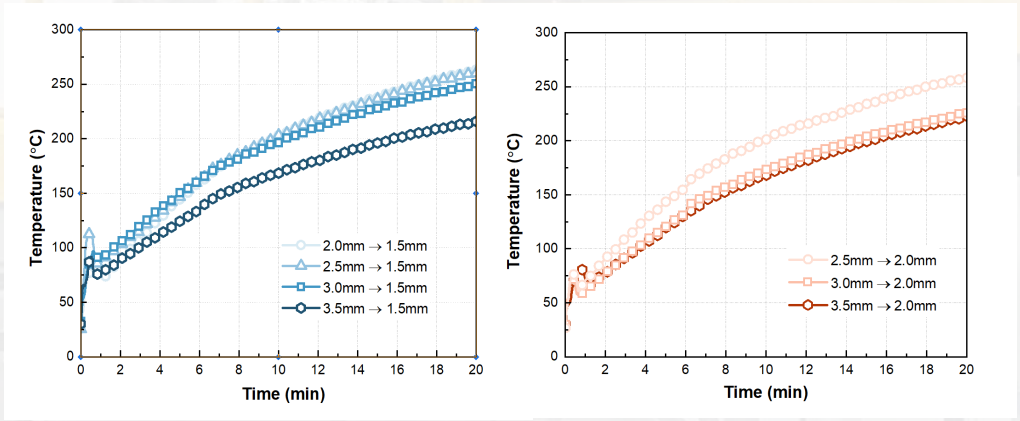
SUPHIP—ZK01 Test data after packaging

High temperature insulation performance test



(**Typical curve:** Cold side temperature under hot surface temperature of 600 °C, 0.9MPa (3min),and 0.03MPa (17min))

Samples	5min	10min	15min	20min
2.0mm→1.5mm	144	203	238	263
2.5mm→1.5mm	146	203	236	260
3.0mm→1.5mm	150	196	228	251
3.5mm→1.5mm	124	168	196	216
2.5mm→2mm	143	201	234	258
3.0mm→2mm	121	173	204	226
3.5mm→2mm	119	168	199	223
4.0mm→2mm	129	173	200	219

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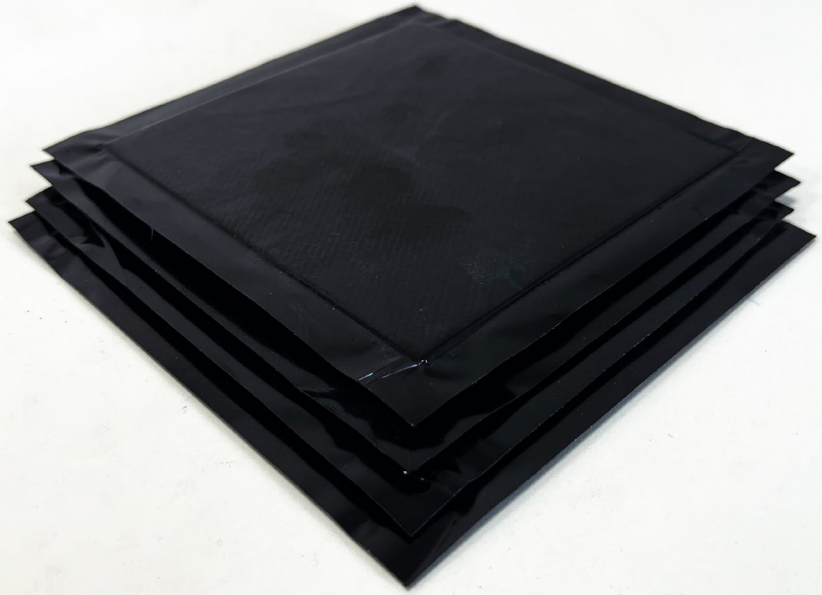
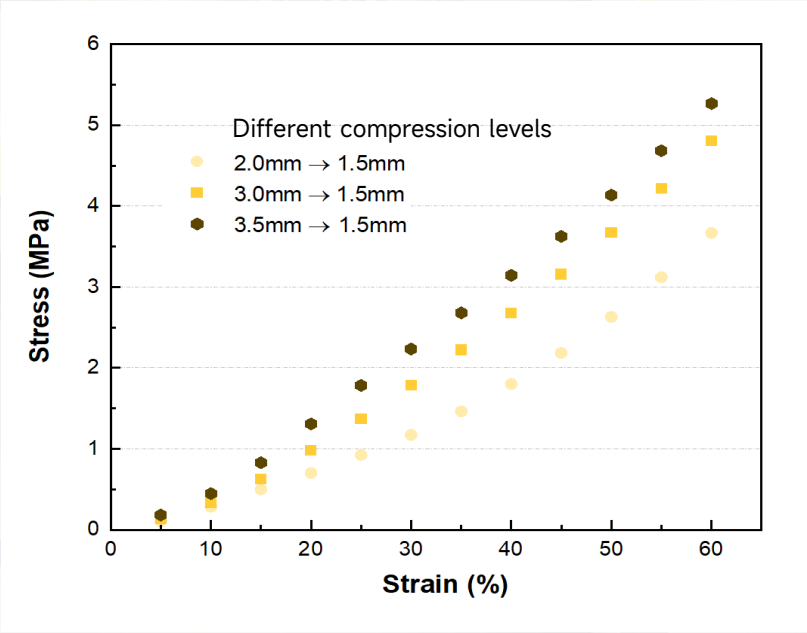
SUPHIP—ZK01 Compress test data after packaging



SUPHIP—ZK01 Product after packaging



Typical curve: Compression performance after packaging

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Empowering Thermal Runaway Safety Through Material Innovation