

JGP Separators for Lithium-ion Batteries



新能源、新材料、新生活

成为国际一流的新能源薄膜产品整体解决方案的提供商

Agenda



- **Company background**
- **Product introduction**
- **Tesla spec & demand discussion**

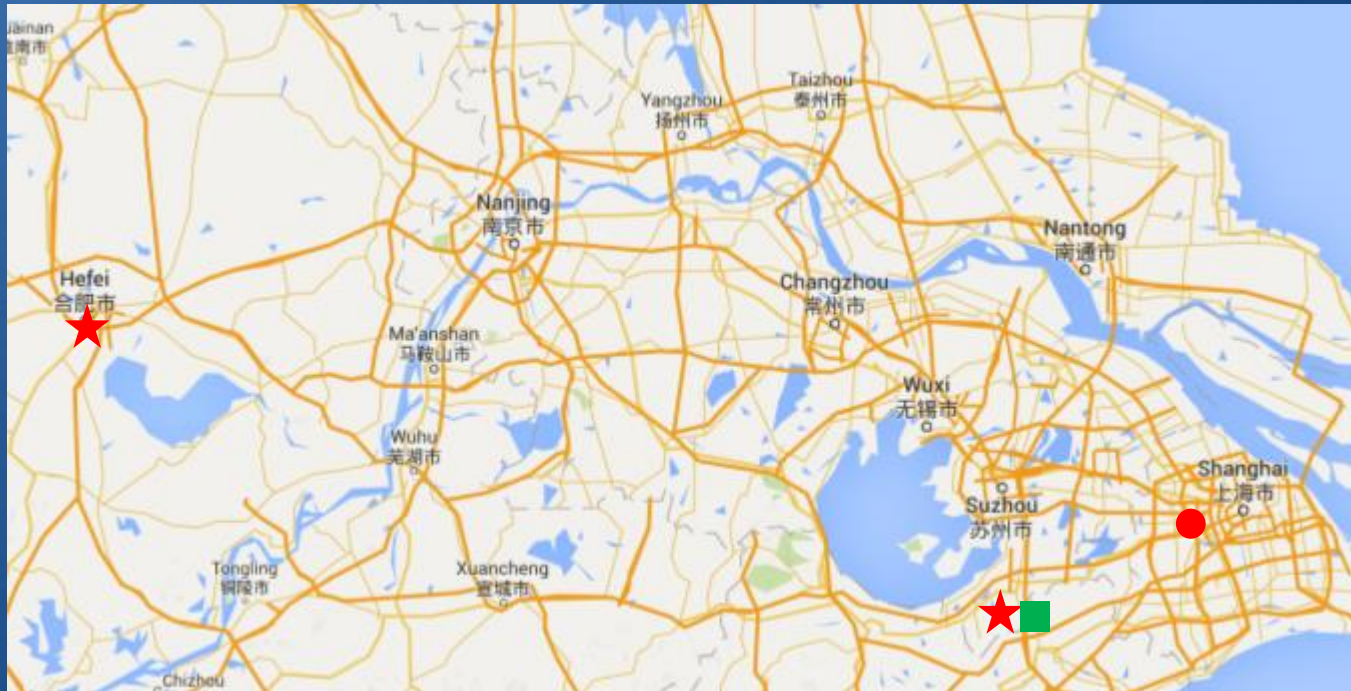
Company Background



- JGP was founded in 2009
- In Zhenze, Suzhou City, Jiangsu Province
- Manufacture polymer thin films for
 - Solar panels
 - Lithium-ion batteries



Company Background



★ MFG Center

■ R&D Center

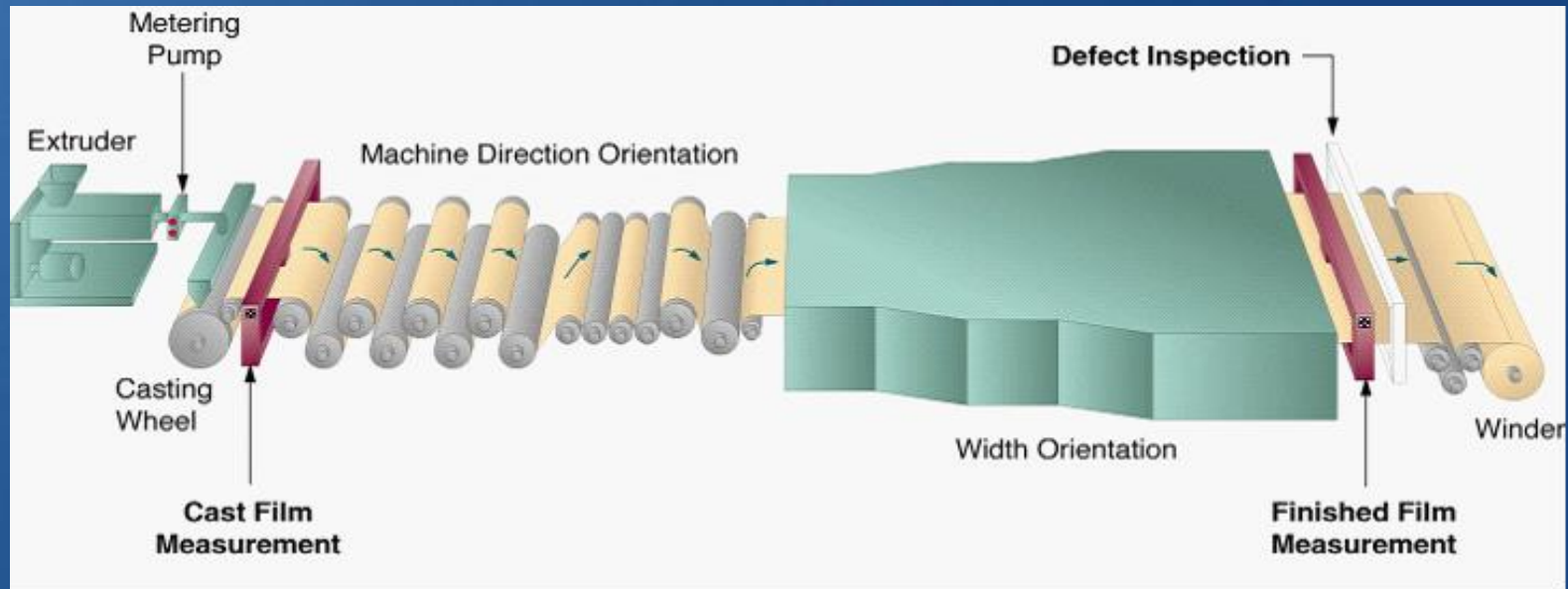
● Office

JGP became a subsidiary of Victory Precision in 2015



Base Film

Wet PE Separator



- Film has very strong mechanical strength
- Superior pore size and pore structure control for high cell performance
- Excellent uniformity of film properties (thickness, gurley)

Base Film Properties

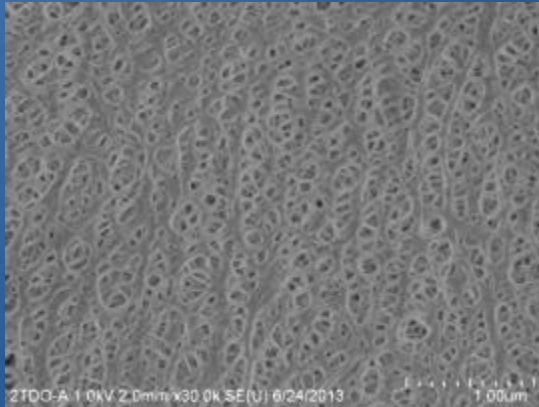


	Property		Unit	Test Condition	CU20M	CU16M	CU12M	CU9M	CU7M
1	Thickness		μm	Gauge	±1	±1	±1	±1	±1
2	Porosity		%	GB/T21650.1-2008	40±5	40±5	40±5	40±5	35±5
3	Gurley		sec/100cc	Gurley tester	280±40	260±40	220±40	170±40	160±40
4	Shrinkage	MD	%	Oven	≤3.0	≤3.0	≤3.0	≤3.0	≤3.0
	(90°C/1h)	TD			≤1.5	≤1.5	≤1.5	≤1.5	≤1.5
5	Tensile strength	MD	kgf/cm ²	ASTM D882-10	≥1500	≥1500	≥1500	≥1500	≥1500
		TD			≥1200	≥1200	≥1200	≥1200	≥1200
6	Tensile Elongation	MD	%	ASTM D882-10	≥80	≥80	≥50	≥50	≥50
		TD			≥50	≥50	≥50	≥50	≥50
7	Puncture Strength		gf	ASTM D5748-95	≥550	≥500	≥450	≥350	≥250
8	Shutdown		°C	10°C/min	135	135	135	135	135

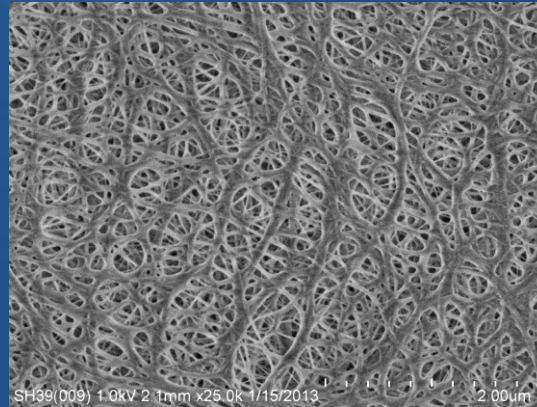
SEM: Base Film



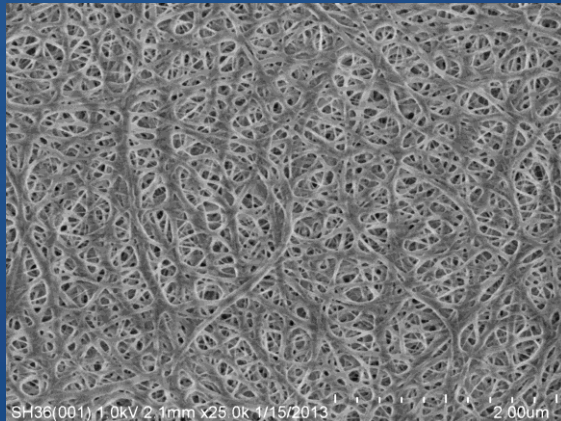
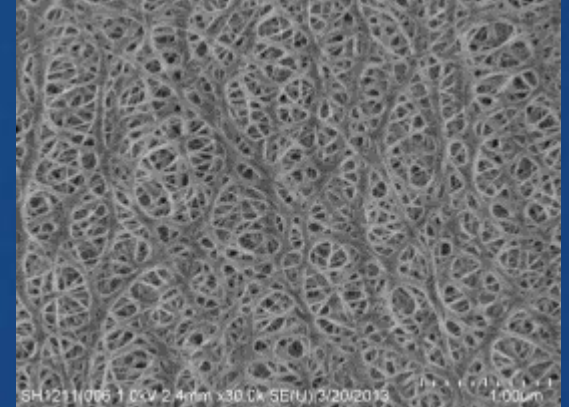
CU20M



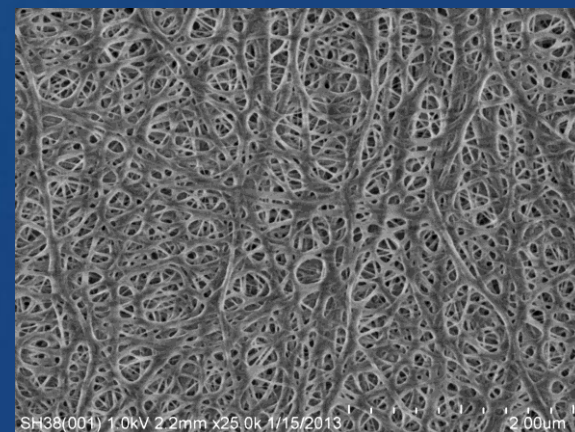
CU16M



CU12M

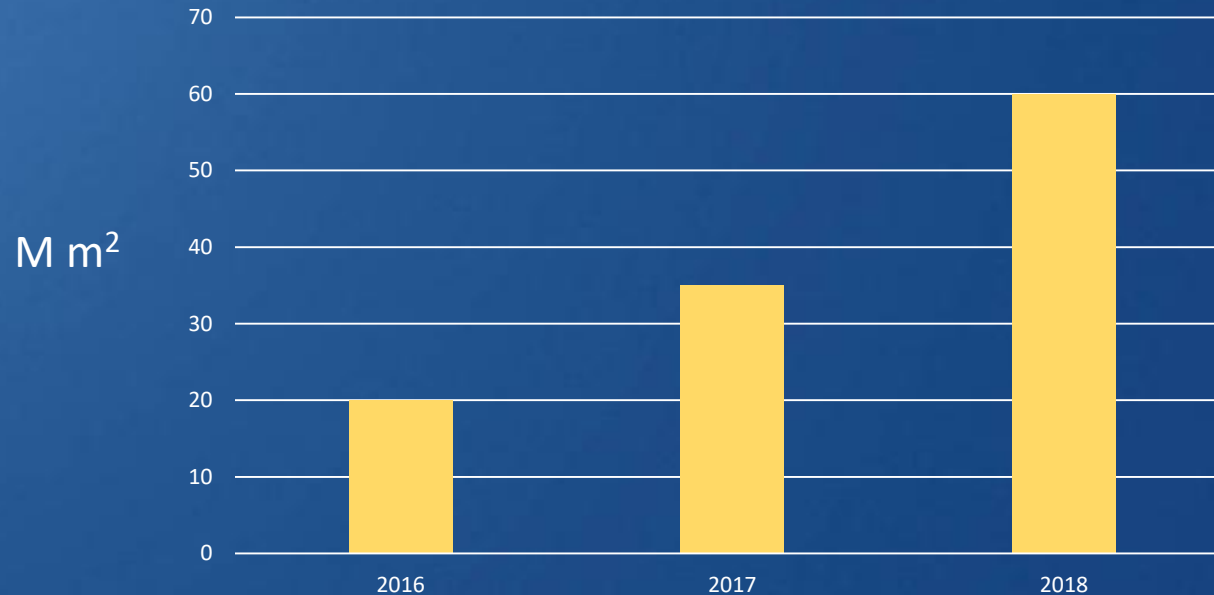


CU9M



CU7M

JGP Base Film Capacity Ramp Up Plan



Capacity roadmap:

- 20M m² per month in 2016
- 35M m² per month in 2017
- 60M m² per month in 2018



Coated Separator

Coated Separator Development

- Coating Formulation
 - Filler
 - Ceramic
 - Al_2O_3
 - Boehmite
 - Water-based polymer nanospheres
 - Binder
 - Electrochemical stability
 - Thermal stability
 - Cost
- Coating Equipment Design/Selection
- Coating Process Optimization

Coated Products



- For low voltage system (LiFePO_4)
 - Al_2O_3
 - Boehmite
- For high voltage system (LiCoO_2)
 - Al_2O_3
 - Boehmite
- Sticky separators: PVDF/Ceramic coating
 - Solvent based
 - Water based
- Sticky separators: water based AFL/Ceramic coating

JGP Coating Capability



- Unique coating technology
- State-of-art coating machines
- Simultaneous double-sided coating
- Wide coating width (1.3m)
- Fast coating speed (80m/min)
- Large scale coating operation (> 10 coating lines)

Advantages of JGP coated separator



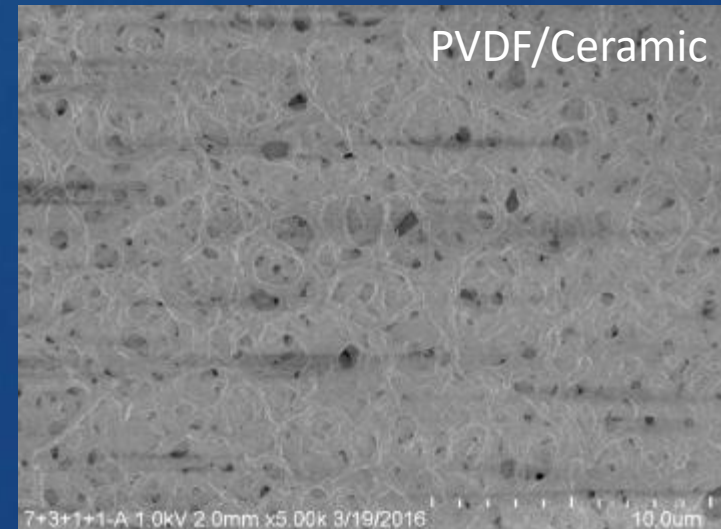
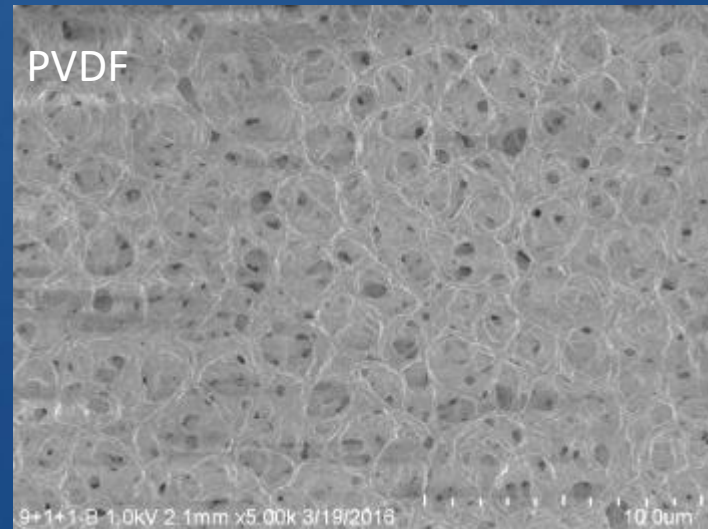
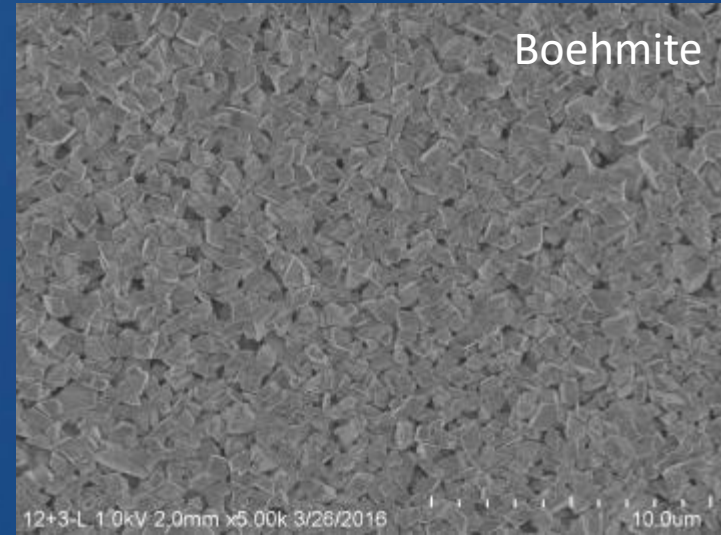
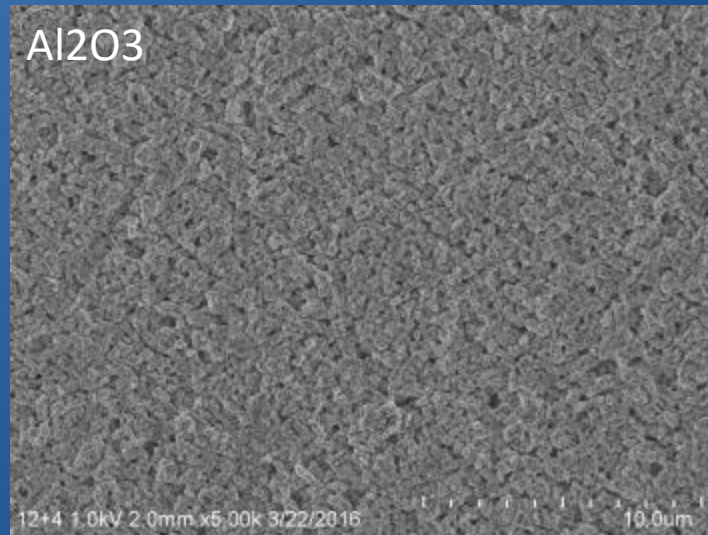
- High mechanical strength
- Good uniformity of thickness and porosity
- Excellent wettability
- High permeability
- Low shrinkage at high temperature
- Low electrical resistance for long cycling life

Ceramic Coated Separators Properties

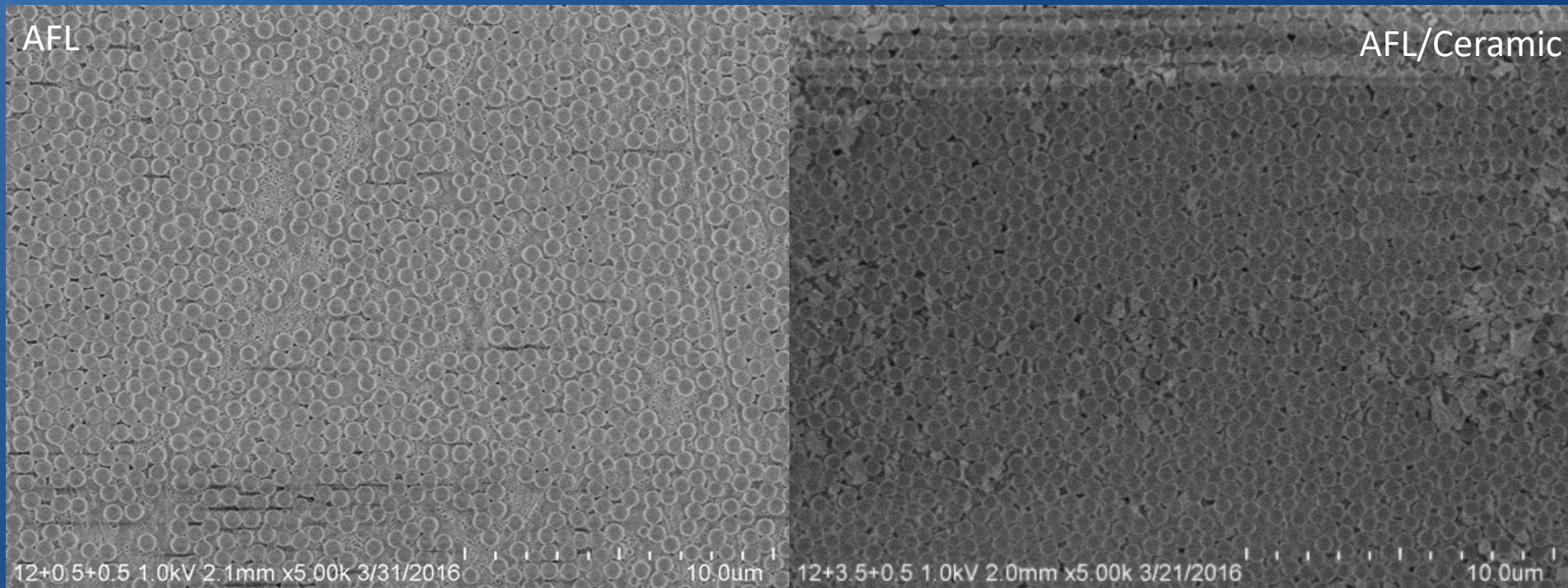


	Property		Unit	Test Condition	CC16S	CC12S
1	Thickness		μm	Gauge	16±1.5	12±1.5
2	Porosity		%	GB/T21650.1-2008	42.5±5	42.5±5
3	Gurley		sec/100cc	Gurley tester	250±50	180±50
4	Shrinkage	MD	%	Oven	≤3.0	≤3.0
	(130°C/0.5h)	TD			≤2.0	≤2.0
5	Tensile strength	MD	kgf/cm ²	GB/T1040.3-2006	≥1500	≥1200
		TD			≥1200	≥1000
6	Tensile Elongation	MD	%	GB/T1040.3-2006	≥50	≥50
		TD			≥50	≥50
7	Puncture Strength		gf	GB/T23318-2009	≥450	≥300
8	Shutdown		° C	10°C/min	135	135

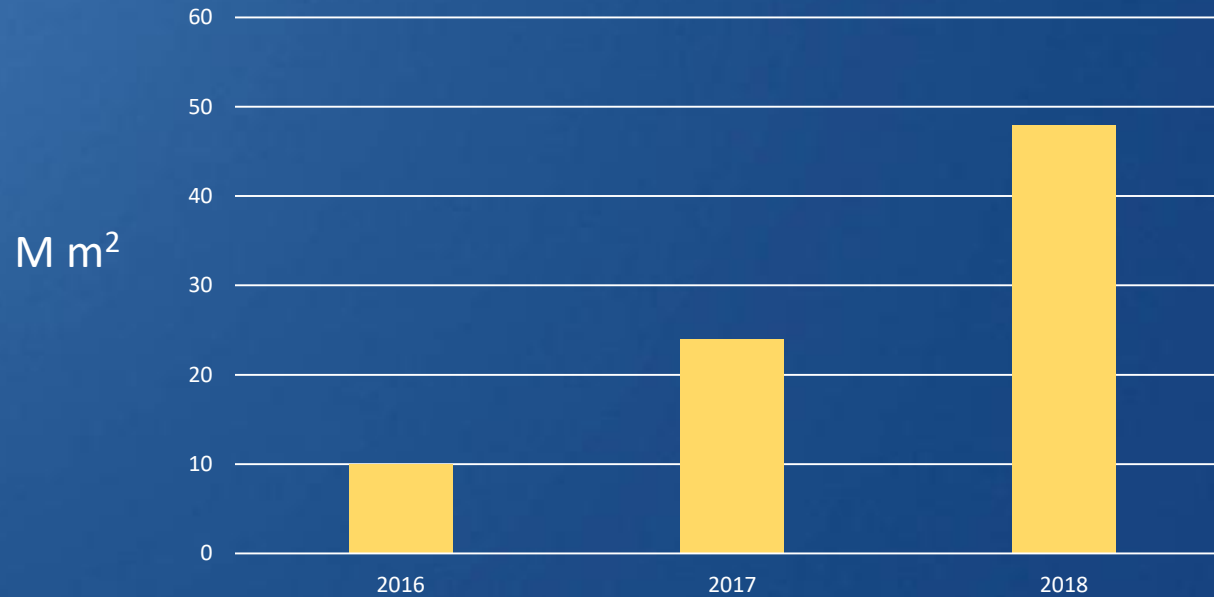
Coated Separators SEM



Coated Separators SEM



JGP Coating Capacity Ramp Up Plan



Capacity roadmap:

- 10 M m² per month in 2016
- 24 M m² per month in 2017
- 48 M m² per month in 2018

Current Major Customers



- ATL
- BYD
- LG
- Samsung
- Lishen
- Coslight



Thanks

Any questions?