The Technologies about Bi-component Microfilaments Spunbond Spunlaced Nonwoven

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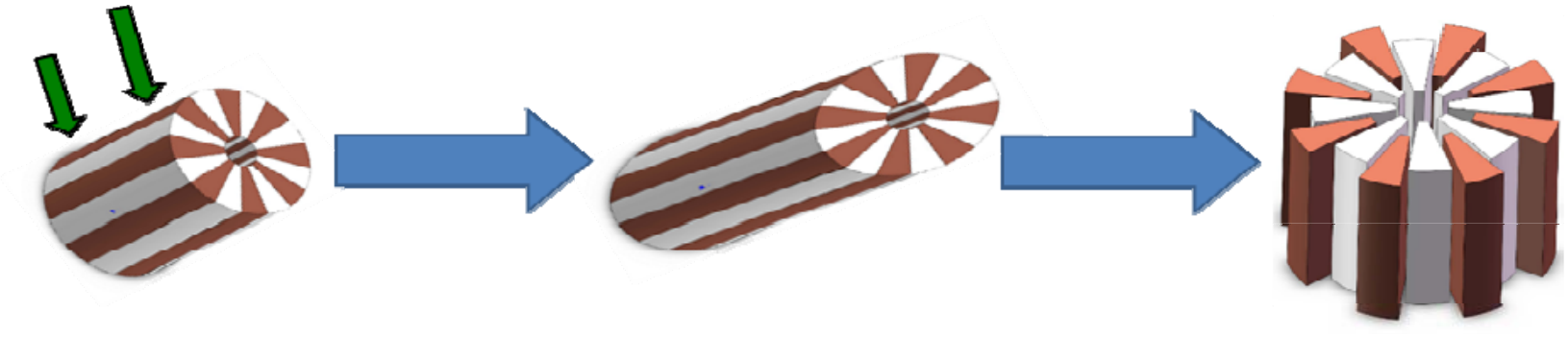
Background

- The annual output of nonwoven fabric in China was about 3.5 million tons in 2018
- The growth rate increased by 9.7% over the same period of the year
- More functional& individualized products are demanded
- Differentiated fibers or filaments have been successfully developed and applied
- Bicomponent spunbond and spunlaced technology combined to produce microfilaments nonwoven

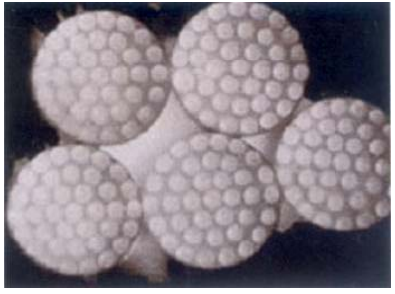
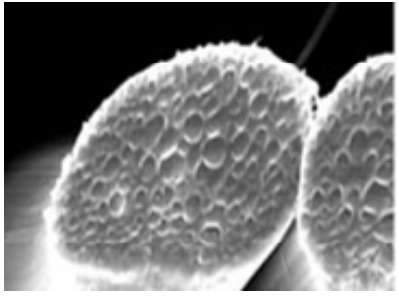
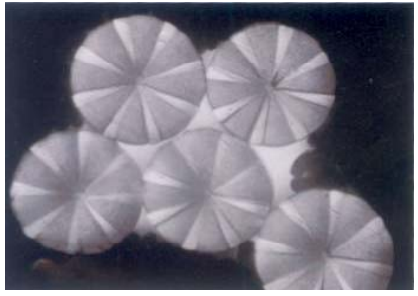
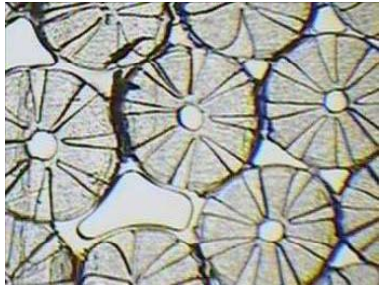


Current Microfiber Nonwoven Technology

●Island-sea bicomponent fiber was applied to nonwoven by carding and needl-pouching.

●Segmented pie (PET/PA) staple fibers were cared and spunlaced to produce 0.1D microfiber nonwoven

●Micro-staple fibers(0.1D) were appled wet-laid and spunlace process.

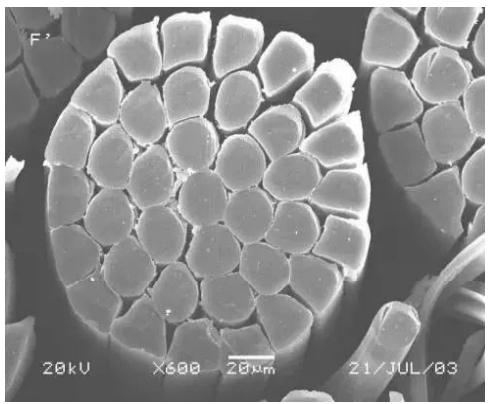





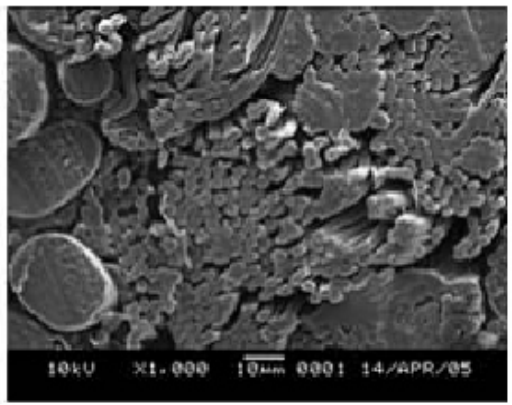
Current Situation of Bicomponent Microfiber Nonwoven Technology in China

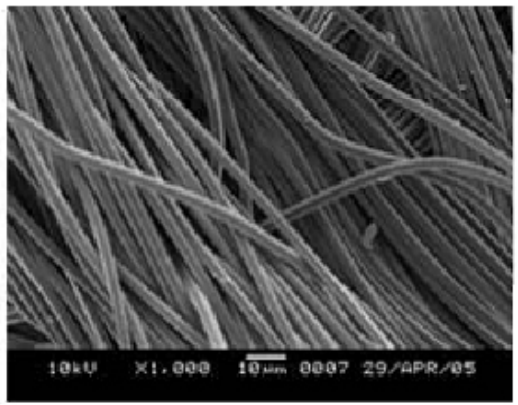
1.Island-sea Microfiber Nonwoven

Two-step production process:

- Staple fibers were processed by opening, carding and needle punching.
- Chemical treatment: the sea component(PET) was dissolved in solvent (Alkali)



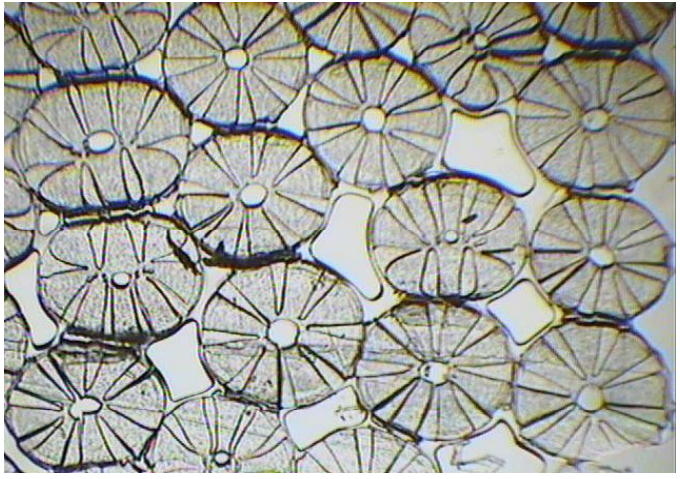




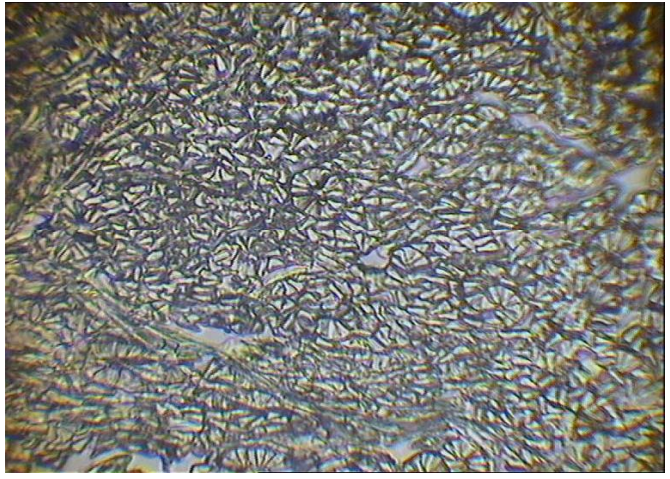
Current Situation of Bicomponent Microfiber Nonwoven Technology Abroad

- The spunbonded microfilament spunlace process was developed in 1999.
- PET and PA component filaments are splitted by water jet.

The cross section of Segmented microfilaments in Hollow Structure before and after splitting:



Before



After

Comparison of bicomponent microfiber technology

Microfiber nonwoven: Island-sea & segmented pie

- Microfiber
  - Sea-island
    - Staple Fiber：Opening，Carding → Needlepunch → Alkali Reduction → Microfiber Nonwoven
    - Filament
  - Segmented pie
    - Staple Fiber：Opening，Carding → Needlepunch → Spunlaced → Microfiber Nonwoven
    - Filament: Spunbonded → Spunlaced → Micro-filament Nonwoven

Segmented-pie Microfiber Nonwoven

Segmented-pie bicomponent micro-filament with hollow structure

Process：

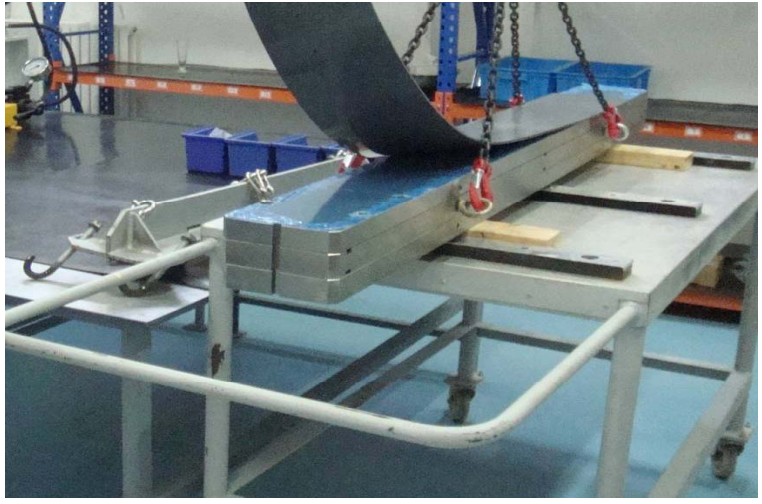
PET chips→Drying→Extruder A→Melt filtration→Metering pump A →
PA6 chips→Drying→Extruder B→Melt filtration→Metering pump B →

→ Spinning beam → Air Quenching→ Web forming → Flat screen spunlace
→ Drum spunlace → Drum dryer→ Winder

Bicomponent microfiber spunlaced nonwoven equipment

1. Bicomponent spinning equipment

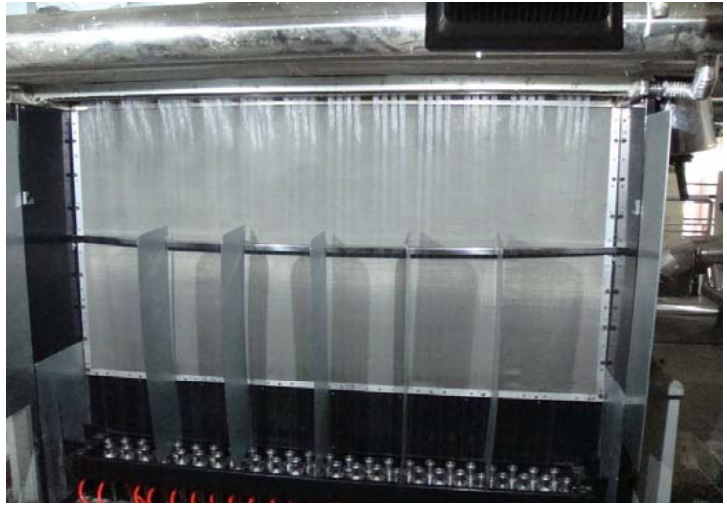
- Key factors: melt viscosity, pressure drop, residence time, and thermal degradation



Bicomponent microfiber spunlaced nonwoven equipment

2. Air quenching equipment

- Steady temperature, humidity& air pressure
- Precise spinning monomer remover



Bicomponent microfiber spunlaced nonwoven equipment

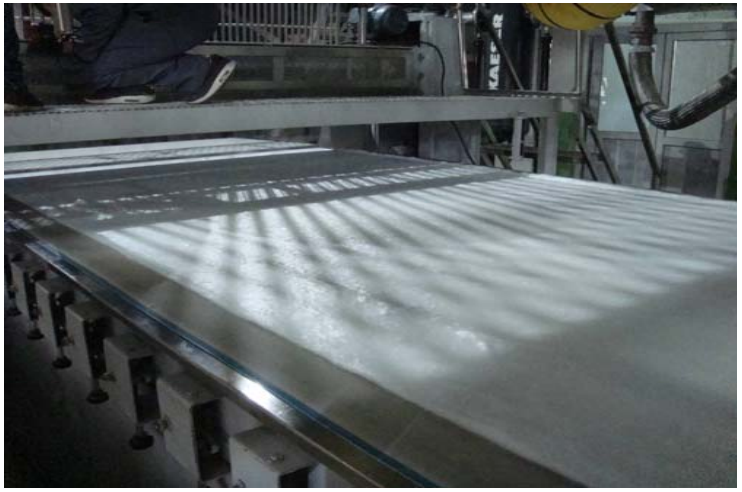
3. Air drawing equipment

- Higher filaments stretching ratio (drawing speed 4500-5000 m/min)
- Higher bico-filaments orientation ratio, greater tensile strength, lower elongation and heat shrinkage.

Bicomponent microfiber spunlaced nonwoven equipment

3. Web-forming equipment

- Double-suction& multi-stage suction air system
- Balanced suction air volume& air pressure at various points



Bicomponent microfiber spunlaced nonwoven equipment

4. Spunlace equipment

- Well distributed high-pressure hydroentanglement
- Prevent dense layer, surface lint& intermediate delamination

Market and application

1. Micro-filament Facial Mask (2-4 μm)

- Extremely soft, silky, skin-friendly, fluffy & breathable
- Large fiber specific surface area,special three-dimensional network structure
- High water absorption and high water release.

Market and application

2. Artificial leather substrate

- Denser three-dimensional structure
- Great Peelling strength and flexing endurance
- No moldy, oder, embrittlement

Applied in shoe leather, luggage leather, sofa leather, automobile interior and clothing leather, etc.

Market and application

3. Functional Wipes

- a large specific surface area. (0.075D)
- superior water absorption capacity (general is 400%-500%)
- lint free, no scratches

Particularly suitable for:

①Advanced cleaning wipes: optical lens, glasses, lap top screen wiping.

②Industry wipes: mechanical processing, electronic devices production, advanced mirror fabrication.

③High-grade household wipes: dishs, baths, furniture, automotives and jewelry.

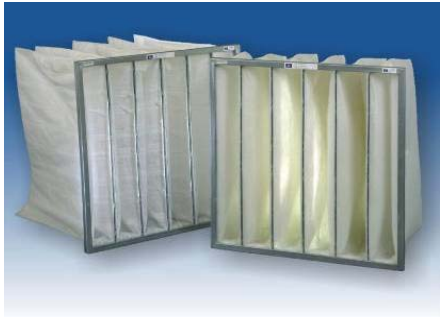
Market and application

4. Filter materials

- more than 90% filaments are splitted
- a denser three-dimensional structure
- extreamly fine pore size and stronger dust holding capacity

Especially suitable for air filtration efficiency can reach 99.9%.

Applied in cabin filters: Golf, Bora, Lavida and other models.



Market and application

Bedding

- 0.075D-0.175D and a fiber diameter of less than 5μm
- Excellent anti-mite effect, great air permeability, down penetration resistance

Prospect development

1. 8+8 segmented pies (16 petals). Finer fiber can be obtained by appling a 16+16 distribution (32 lobes) section.
2. Not only PET+PA as raw material, it is possible to develop more raw materials such as PET/COPET, PA6/PP, PA6/PE, etc.
3. Needle punching process added before spunlacing. A more fluffy product can be obtained.

Contact Us

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