

杜邦™ Sorona® The Next Generation Fiber

下一代纤维



DUPONT™  
Sorona®

Presented by:

**James Zhan** DuPont Industrial Bioscience

# Agenda

- What is Sorona® Polymer? 什么是Sorona®聚合物？
- Why Dupont promote Sorona® ? 为什么杜邦要推广Sorona®
- Sorona®, performance 特殊性能
- Broadly applied to different application Sorona® 在不同市场的应用

**What is Sorona®?**

**什么是Sorona®？**

# How Sorona® polymer is made? Sorona® 聚合物怎样制造的？



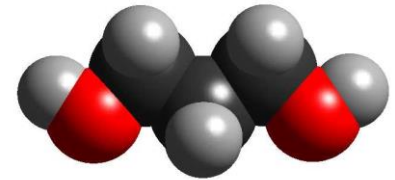
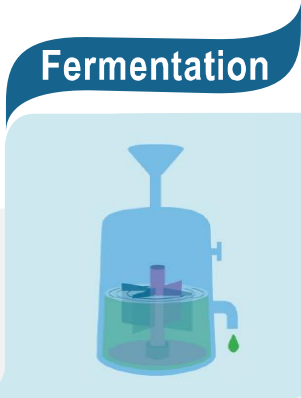
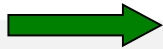
Sorona® is a Renewably Sourced Material  
made from Bio-PDO™ 含有可再生材料，来自生物科技的PDO



inputs



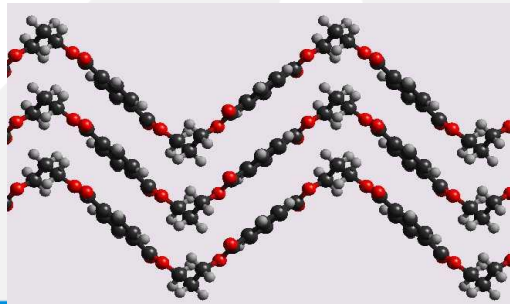
CO<sub>2</sub>



Bio-PDO™  
(1,3-propanediol)



DMT/TPA



Polymerization

## 石油基產品



Oil



Petrochemicals



Materials  
Nylon 6  
Nylon 6,6



Yarn



Carpet

## 可再生產品 Sorona®



Agricultural Feedstock



Sugars



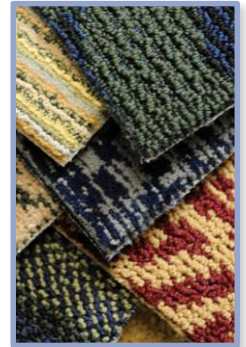
BioChemicals  
Bio-PDO®\*



BioMaterials  
Sorona®\* (trixeta)



Yarn

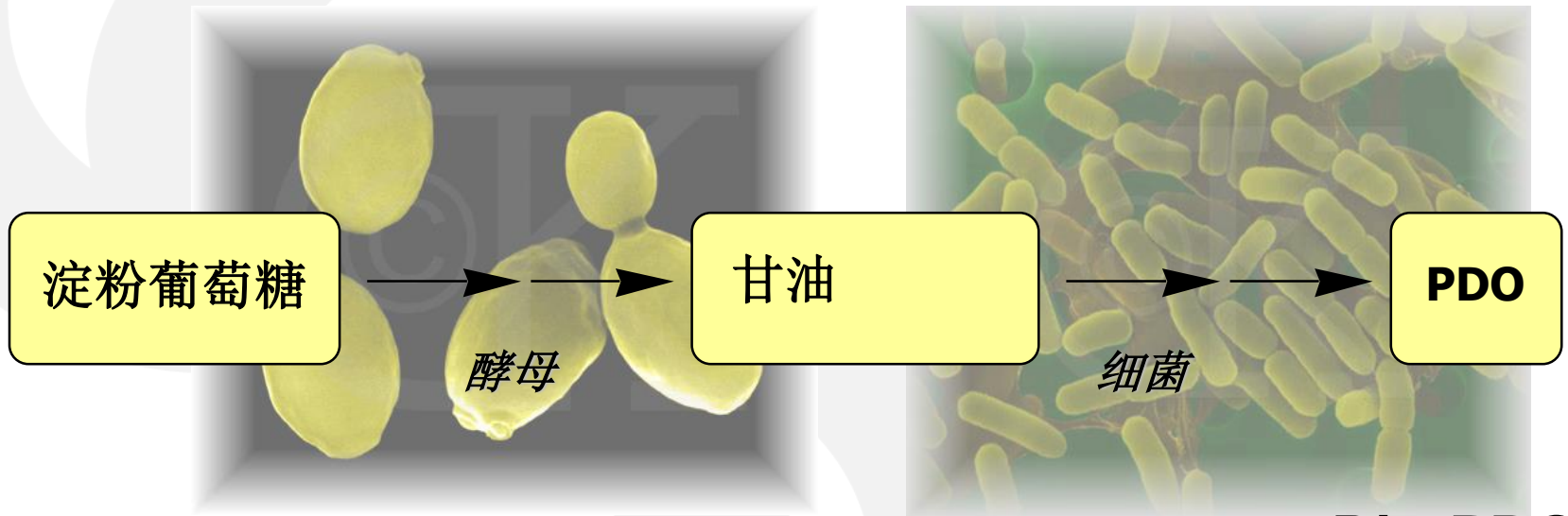


Carpet

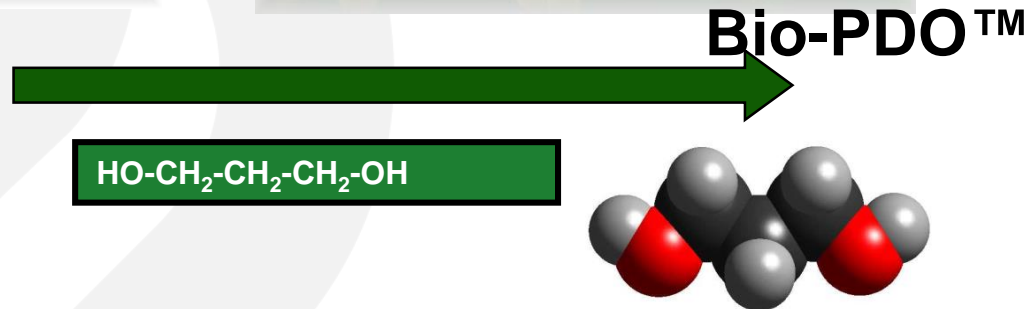
\* Sorona® and Bio-PDO® are DuPont branded products that are bio-based alternatives.

# 生物基PDO：从葡萄糖到 1,3-丙二醇

在自然环境下：  
两种微生物将糖份转化成PDO。



在工业环境中：  
只需要一种微生物即可。

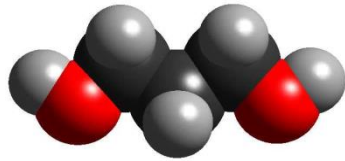


# Sorona<sup>®</sup>是一种性能卓越的特殊聚合物

1,3- 丙二醇

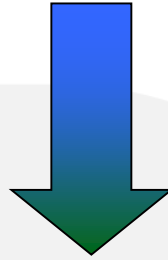
+

DMT or TPA

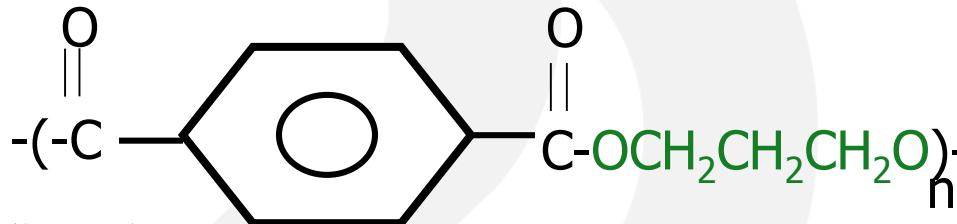


Bio-PDO<sup>™</sup>

催化剂



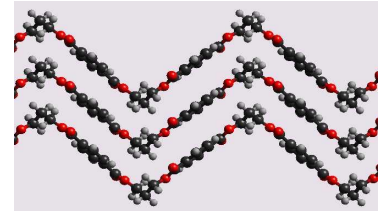
- 独特功能的聚合物
- **37%** 可再生成分
- 不含 铈催化剂



聚对苯二甲酸丙二醇酯

(PTT)

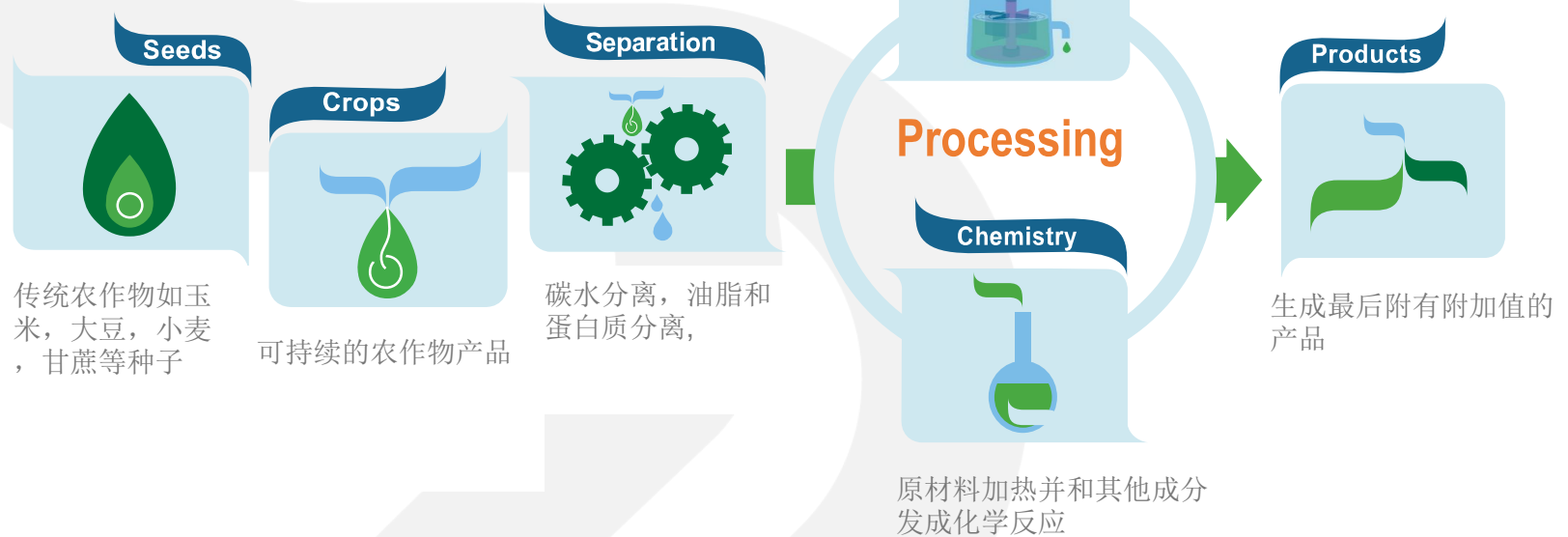
Sorona<sup>®</sup> 聚合物



# 可再生工艺的概述

化学工艺，材料科学和工程，对制造可再生产品都非常关键，以不牺牲材料的性能和成本为代价，满足客户的需求基础上。

细菌将农作物分解成小分子原材料





# How to identify Sorona renewable content 怎样检测Sorona 可再生含量？

According to ASTM6866-08, test the age and ratio of C-14 contained in Sorona polymer 依据ASTM6866-08, 检测 Sorona® 聚合物中碳-14的年龄和比例。

那里可以检测：

-美国Beta

-上海SGS



Beta Analytic Inc.  
4885 SW 74 Court  
Miami, Florida 33166 USA  
Tel: 305-667-6167  
Fax: 305-663-0964  
info@betalabservices.com  
www.betalabservices.com

报告摘要：利用ASTM D6866-08检测生物基含量

Submitter: Ms. Lin Fang		Date Received		May 10, 2010
DuPont (China) Research & Development and Management Co., Company: Ltd 社邦(中国)研发管理有限公司		Date Reported		May 14, 2010
Laboratory Number	Submitter Label	Material	ASTM D6866 Method	Mean Biobased Result*
Beta-279392	Sorona® PTT Polymer J2248	生物基固体样品	METK0D-B	28%

**Why Dupont promote Sorona®?**

**为什么杜邦要推广Sorona®？**

# 杜邦已跨越两个多世纪

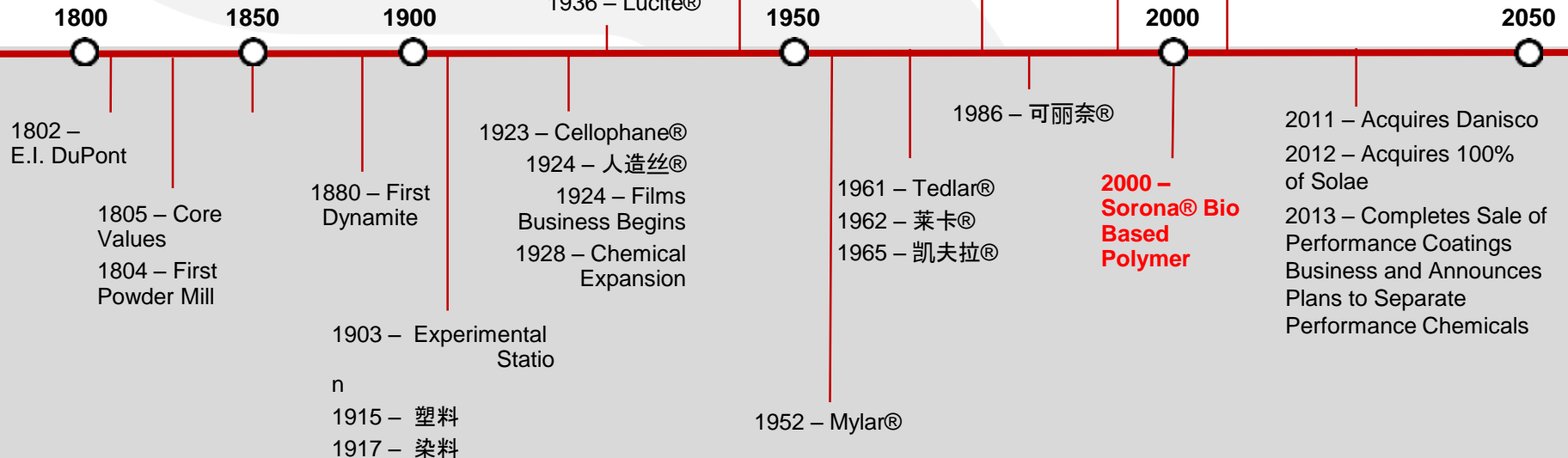


DUPONT™  
SORONA®

科学

化学

炸药



In 2011, the world's population reached 7 billion people...  
2011, 世界人口达到70亿....

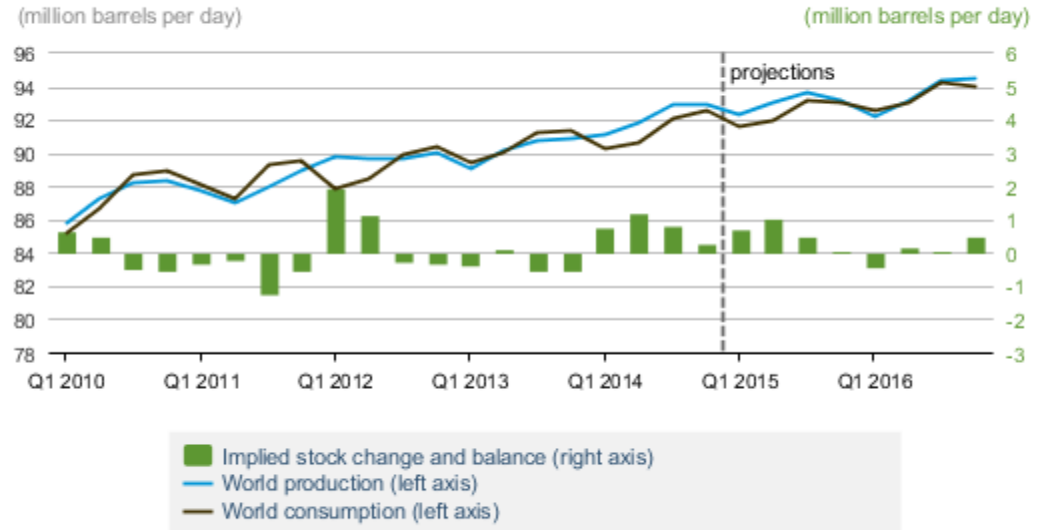


To 2050, the world's population will reach to 9 billion  
2050年后人口将达到90亿

• This huge population growth is presenting the world with really BIG challenges. 如此多的人口开给世界巨大的挑战.



**World Liquid Fuels Production and Consumption Balance**



eia Source: Short-Term Energy Outlook, January 2015

REDUCING OUR  
DEPENDENCE ON FOSSIL  
FUELS  
减少对石化产品依赖

# Negative impact by Oil 化石原料对环境的负面影响



- AQI空气质量指数，参与评价的污染物为PM2.5, PM10, SO<sub>2</sub>、NO<sub>2</sub>、O<sub>3</sub>、CO等。
- 燃烧化石燃料，所产生的烟雾排入大气，是主要的空气污染原因之一；

# DuPont Heritage of Leading Innovation in the Carpet Industry 杜邦在地毯行业



- Invented nylon in 1930's 1936年發明尼龍66
- Invented BCF in mid-1950's 1950年發明BCF 技術
- Launched Stainmaster, in the mid-1980's 80年代中，創造最成功的地毯品牌
- Invented fiber shapes with soil hiding features in early 1990's 90年代推出安特強纖維
- Spun off the nylon fibers business in 2004 2004年賣出全球纖維部分，迎接下一代纖維
- Mohawk SmartStrand made with DuPont™ Sorona® 2005年 Mohawk SmartStrand 開始使用 Sorona
- Automotive carpet adoptions in 2008 2008, 汽車地毯
- Commercial carpet at 2012 2012 商用地毯

**What is Sorona® Carpet Performance?**

**Sorona®地毯的特殊性能？**

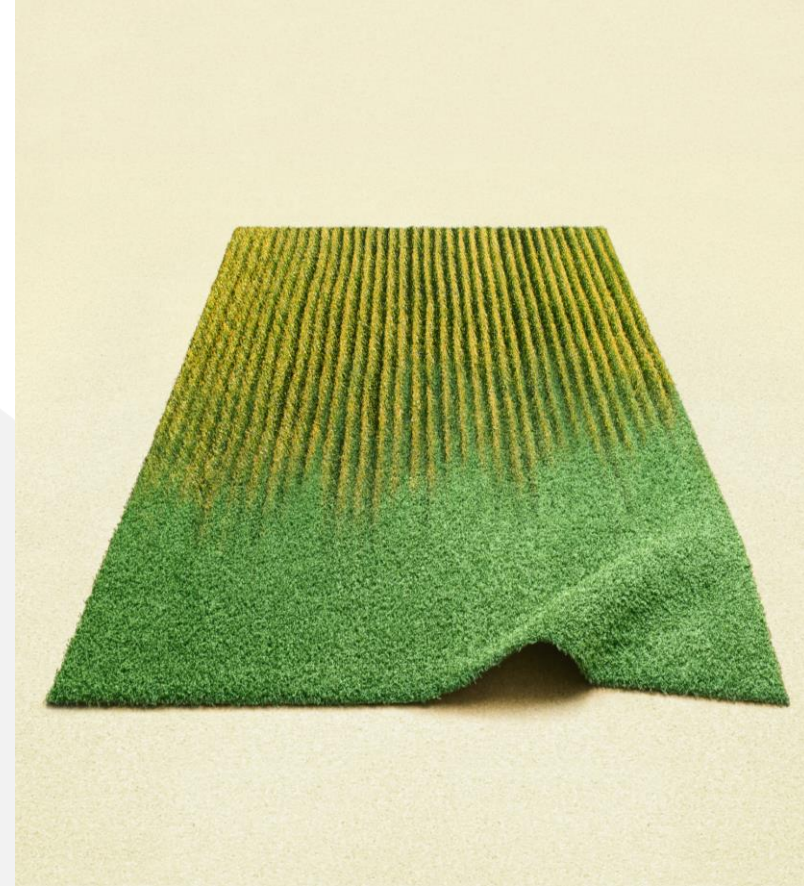


# Sorona<sup>®</sup>, Sustainability 绿色可持续

# Renewably sourced DuPont™ Sorona® offers a unique combination of environmental benefits 可再生資源的DuPont™ Sorona®提供的環境效益

- 與尼龍6相比，Sorona®在製程上的優勢
  - uses 30% less energy  
少用30%的能量
  - reduces greenhouse gas emissions by 63%  
減少63%的溫室效應氣體排放
- 與尼龍66相比，Sorona®在製程上的優勢
  - 少用40%的能量
  - 減少57%的溫室效應氣體排放

The environmental benefits of Sorona® are supported by peer-reviewed, third-party Life Cycle Analysis conducted according to ISO standards.



# Sorona<sup>®</sup> – recognized for sustainability in design 設計中的可持續

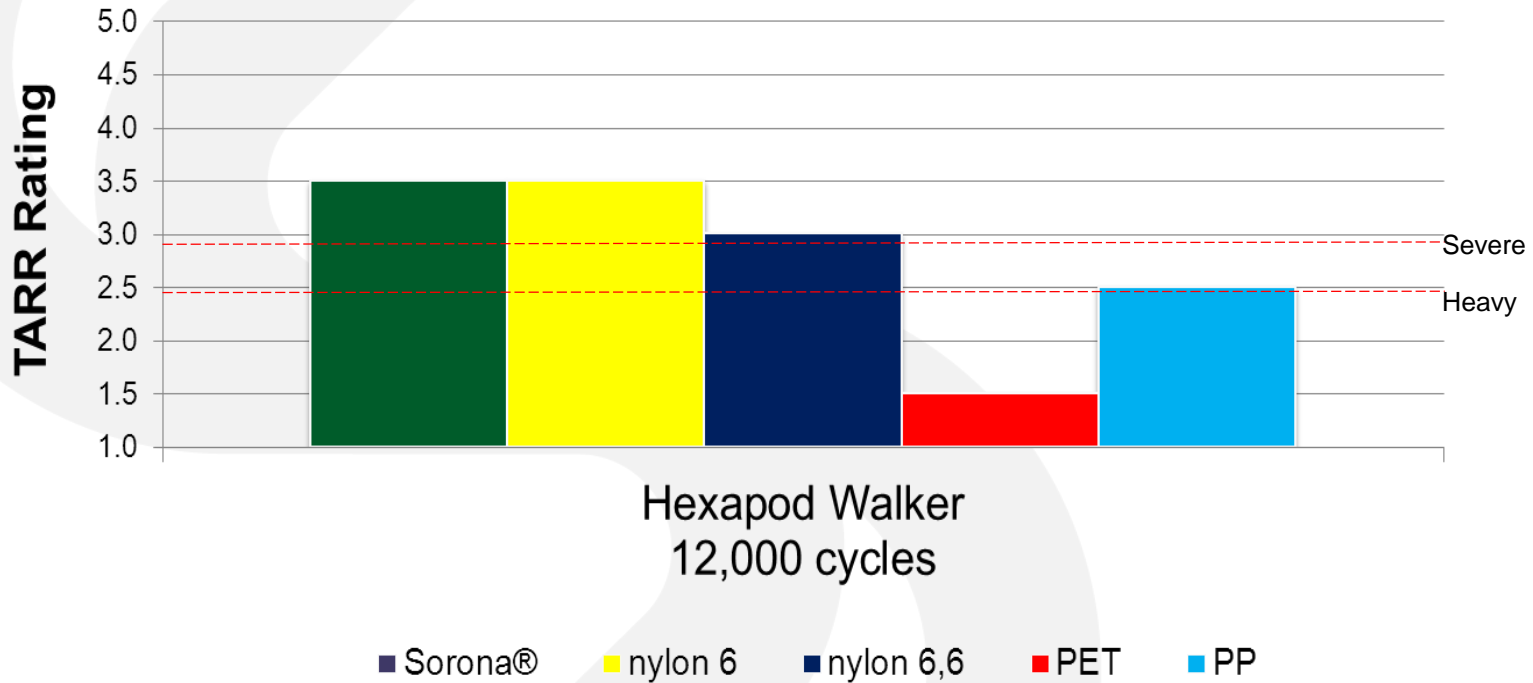


- Earn LEED<sup>®</sup> points for carpet in the following categories:  
贏得更多的LEED 分值
- Materials and Resources (MR): Rapidly Renewable Materials  
Materials and Resources (MR): Regional Materials  
Indoor Environmental Quality (IEQ): Low Emitting Materials-Carpet
- Sorona<sup>®</sup> is one of the first 11 products approved to use the new BioPreferred label for certified bio-based products by the U.S. Department of Agriculture (USDA)  
是美國農業部首批公佈11種可使用BioPreferred 標籤的生物基產品

# Performance 卓越性能

# Durability 耐磨

# 由sorona纤维制成的地毯可以承受高级别的人流量耐磨



# Stain resistance 永久耐污

# DuPont™ Sorona®地毯 抗污評測5分-滿分！



Mustard



Ketchup



Fruit drink



Soil



Cola



Red wine

Ink



Coffee



Lipstick



Hot tea

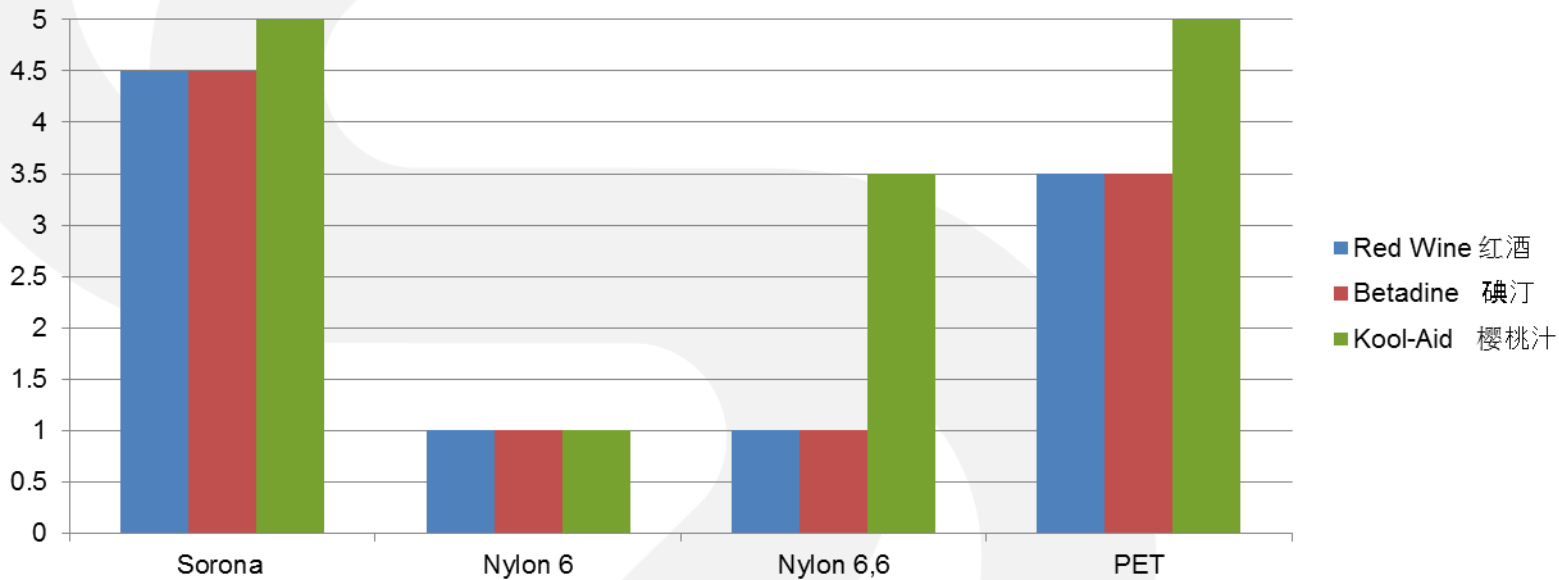




# Carpet with DuPont™ Sorona® stands up to the toughest stains Sorona®地毯可以承受最强抗污



Stain resistance test without topical treatments:  
未经氟化学三防处理的地毯

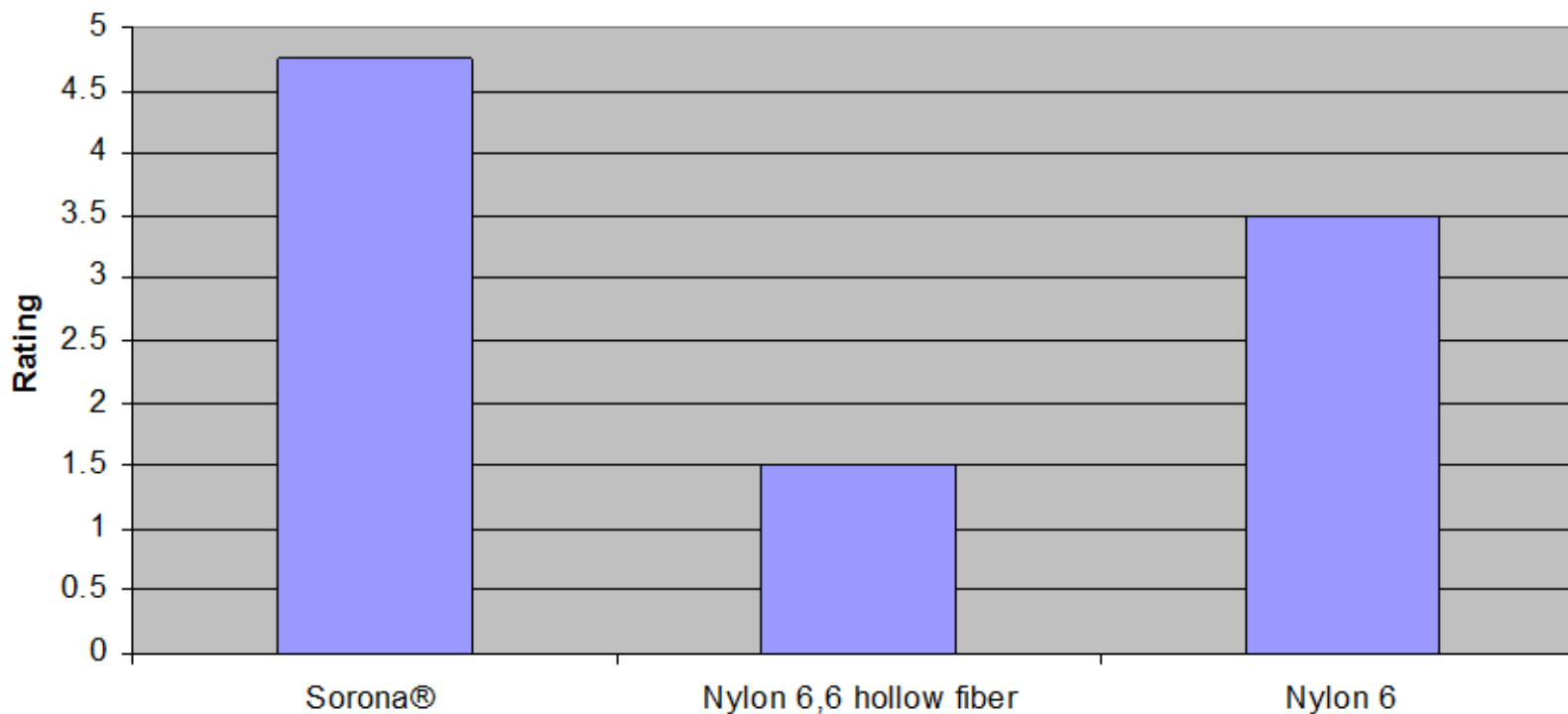


Staining method: AATCC 175-2008  
Testing conducted by:  
The Professional Testing Laboratory  
Inc., Dalton, GA  
Carpet produced by:  
The Product Factory Inc., Dalton, GA

Carpet Construction:  
loop-pile, 24 ounce, 10<sup>th</sup> gauge,  
0.19 inch pile-height, solution-dyed  
Broadloom, no topical treatments

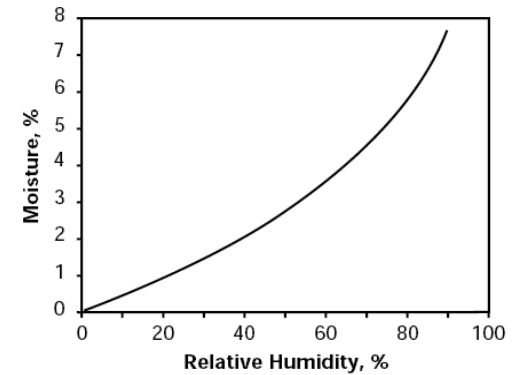
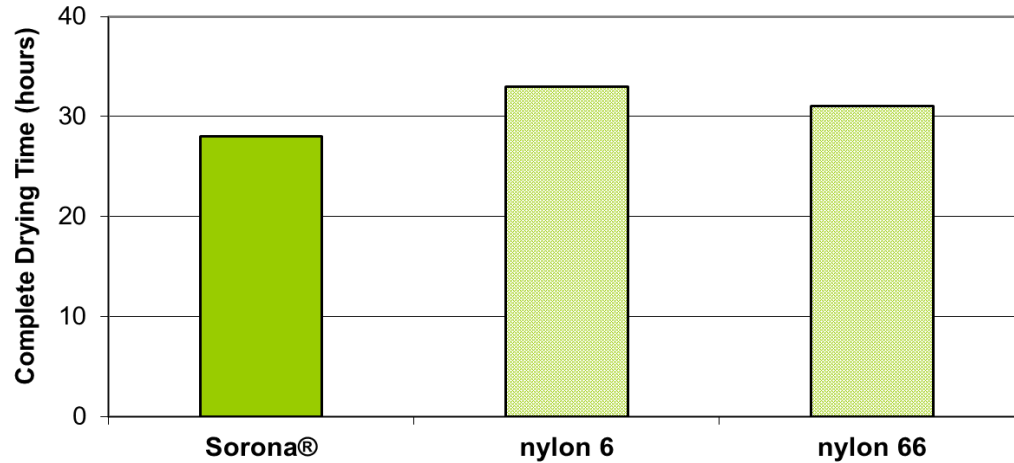
# 超强的耐漂洗抗褪色性能

## Bleach Resistance



Carpet construction: 24 oz./yd<sup>2</sup>, 4.75 twists/in., Superba set 10<sup>th</sup> gauge, 0.22 in. pile height, loop pile  
Method: AATCC standard 6, 24-hour chlorine exposure with 5.25% NaOCl

# Fast Dry 速干



Sorona® 地毯比尼龙6快干15%，比尼龙66快干10%  
Sorona®; 更好的，更天然的抗菌，抗霉效果

Cost 业主的成本

# Lower the cost 降低地毯业主的成本

- General maintenance and cleaning costs  
長期的维护和清洗成本

Sorona® 超强抗污，只要清水即可

- Replacement costs due to wear and staining  
一次性更换地毯成本
- Carpets made with Sorona® stand up to everyday wear  
超强耐磨，延長使用寿命

Widely apply to different application  
Sorona® 在不同市场的应用

# DuPont 市场支持



- 纸面和在线广告创造Sorona®品牌的认知度
  - Interior Design
  - Interiors & Sources
  - Architecture
  - Buildings
  - Sustainable Facility
- 展会
  - Greenbuild
  - HD Expo
  - Neocon
  - Healthcare Design
  - Domotex Hannover
  - Domotex Shanghai
  - A@W
- ARC Interiors
- Sales Kits
- End-user sales force
  - Sorona®
  - DuPont Building Innovations

# 民用及商用地毯

## Mohawk 莫和克



Mohawk Flooring - SmartStrand Silk - Luxuriously Soft - Windows Internet Explorer

http://www.mohawkflooring.com/flooring-products/carpet/smartstrand-silk.aspx

File Edit View Favorites Tools Help

★ Favorites Mohawk Flooring - SmartStrand Silk - Luxuri...

MOHAWK

ABOUT MOHAWK 1-800-2MOHAWK (800-266-4295) Login / Join

Search by product name  SUBMIT Store Locator

Flooring Products Flooring Ideas Flooring Guide Care + Maintenance Greenworks Customer Care

My Gallery (0)

Carpet Hardwood Tile Laminate Luxury Vinyl Area Rugs Aladdin Commercial

Better Homes and Gardens  
AS SEEN IN  
SmartStrand Silk  
with DuPont® Sorona® renewably sourced polymer

"The ONLY luxuriously soft carpet with built-in stain and soil protection that never washes or wears off."

#1 RATED #1 IN CUSTOMER SATISFACTION

OVERALL RATING  
★★★★★ 4.8 / 5 p  
Read 38 reviews [write a review](#)



# 民用及商用地毯

Godfrey Hirst



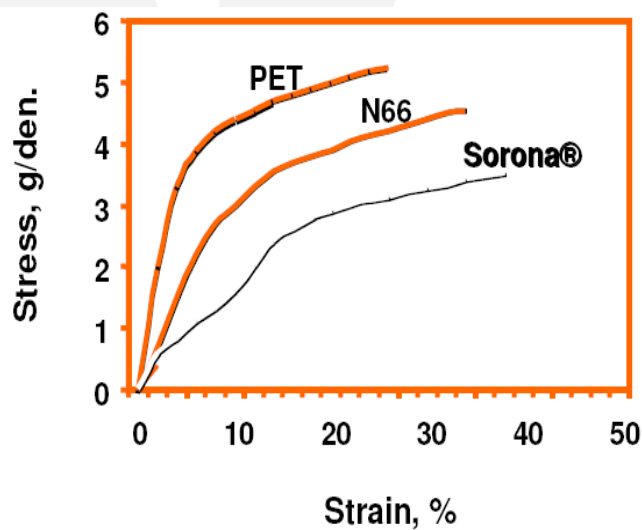
## Sorona® 在家用地毯上的优势

- 天然永久抗污
- 柔软
- 更快干、更防霉、抑菌
- 更少异味
- 更好抗UV
- 可以减少30%的能源消耗，可以减少63% GHG 的释放
  
- 多样染色方式 (原液染色, 筒染, 匹染, 印花, 等等)
- 可再生资源纤维

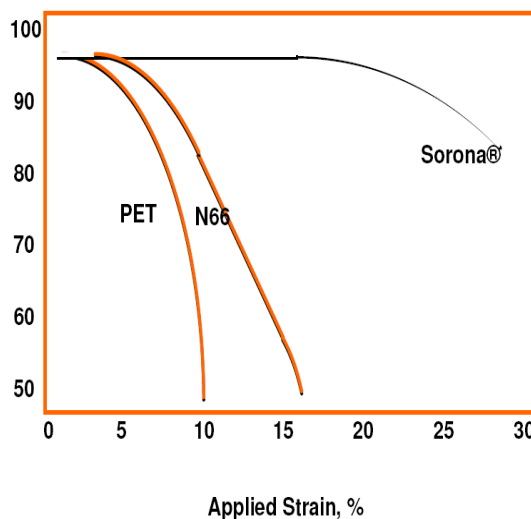
# Sorona® 纤维特性



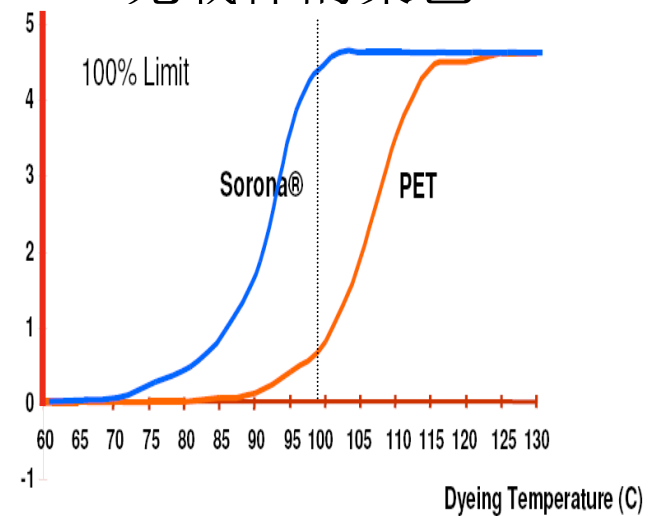
柔软



高弹性回复



无载体的染色



# 汽车地毯



## •汽车地垫和地毯

- 丰田 普锐斯, SAI
- 本田 CR-Z, Insight
- 三菱 I-MiEV, Pajero
- 尼桑 Leaf
- 雷克萨斯

# Sorona<sup>®</sup> 应用在汽车中的纤维



**Seat Fabric**



**Head Lining & Pillar Garnish**



**Floor Carpets**



**Floor Mats**



**Luggage Trim and Netting**

# Sorona® 服装



Be environmentally cool!  
DuPont™ Sorona® » [Find Out More](#)



## Benefits:

- Comfort stretch and recovery
- Soft hand
- Stain resistance
- Easy care
- Easy dye
- UV/Chlorine resistance

# Sorona® Head to Toe in Apparel

- Pants and Jeans
- Knit Tops
- Woven and Knit Shirts
- Sweaters
- Activewear –  
Functional/Streetwear/Golf Apparel
- Scarves, hats, gloves
- Outerwear
- Socks, Underwear, Intimate Apparel
- Accessories (bags, etc.)
- Shoes

IZOD



ZOKE 8

网站正在建设中 敬请期待  
Website under construction...

WUNDERVOLL<sup>^</sup>  
LUXURY UNDERWEAR



PERRY ELLIS<sup>®</sup>



nicole miller



FALKE

# 2016 RIO Olympic Medal Uniform & Training T-shirt for Chinese Delegation —made with DUPONT® SORONA®

June 29<sup>th</sup>, 2016



**去打破**  
环保新面料  
安踏 助力中国军团全新一代  
KEEP MOVING

**SURPRISE YOURSELF**  
31<sup>th</sup>  
RIO

**去打破**  
安踏 助力中国军团全新一代  
KEEP MOVING

**中国**

**= Breakthrough With Innovations**

可乐瓶+植物=领奖服？你没看错！  
经纱采用聚酯再生纤维，纬纱以植物为原料经过生物科技改造而成 Sorona® 生物质纤维。  
Sorona® 纤维生产过程中，相比传统尼龙6，少利用37%的不可再生燃料，减少30%不可再生  
能耗和63%的温室气体排放。



# Sorona® obtain Oeko-Tex certification

杜邦™ Sorona®通过了Oeko-Tex®和德国海恩斯坦研究院  
Standard 100

标准1类的认证。

源自可再生资源的Sorona®聚合物经检测认证可用于纺织品（包  
括服装，

以及家居、办公和汽车内饰纺织产品）和地毯（即家用、商用和  
包括脚

垫等汽车地毯）。

Oeko-Tex® 1类认证是最为严格的检测标准，并且适用于包括婴幼  
儿消

费者在内的纺织和地毯产品。



## DuPont renewable material in other commercial area design 可再生材料在其他商用室内设计



- Office Chair by Knoll
- Made with Hytrel<sup>®</sup> RS
- Soon with Sorona<sup>®</sup> EP
- Neocon 2009 Gold Award

# Triexta 纤维



- 2009年3月20日，美国联邦贸易委员会批准PTT 纤维使用一项新属名 ...

- 

- 

triexta

- 与现有纤维相比，Triexta纤维独特地结合了超强的耐用性和抗污性。

- 美国联邦贸易委员会根据地毯测试作出了上述审批。此测试证明triexta制成的地毯比普通聚酯制成的地毯在抗污性和耐用性上表现更出色。

Question?

杜邦生物科技Sorona®

James.zhan@dupont.com

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