

# Soft TPO Applications

## 会议 1: 软热塑性聚烯烃弹性体 (TPO) 的应用

**Presentation #1/ Plenary Talk: Ken Gassman,**  
Inteva Products LLC (USA)

### Trends in Automotive Interiors

In today's automotive industry, OEMs and suppliers are working hard to set themselves apart. During this talk, we will discuss how vehicle interiors are influenced by everything from nature to fashion and how manufacturers and suppliers are addressing these trends.



- The exterior grabs you, the interior holds you. Consumers now expect luxuriously designed interiors to match the highly designed exterior, no matter the vehicle segment.
- Designers are driven by insightful and ingenious ideas. Defining new standards in vehicle interior design, style, performance, and comfort is the result of a multitude of influences and inspiration.
- The fashion industry is bringing forward new elements of design in textiles, textures, patterns, and stitching. Learn how automotive designers can integrate that industry's best practices into well-crafted interiors.
- The vehicle's interior is becoming an outlet for personalization and creativity. It is helpful to look outside the automotive industry to stay on top of trends, apply uncommon expertise, and develop new product and process ideas.
- Not only do today's interiors look and feel like fashion showpieces, they can meet and even surpass our industry's needs in terms of cost, form, and function, durability, low weight and low mass. All require technical ingenuity.

**报告#1/大会报告: Ken Gassman, Inteva Products LLC (USA)**

### 汽车内饰的发展趋势

在如今的汽车工业领域, 设备制造商和供应商们正在不断努力使产品与众不同。在这个报告中, 我们将讨论从自然到时尚的众多不同因素对汽车内饰的影响, 并且突出制造商和供应商们是如何迎合这些趋势的。

- 外饰吸引你, 内饰捕获你。无论是汽车的哪个部分, 现在的消费者期望更加奢华的内饰设计以符合高质量的外部设计。
- 设计师们受独创的、精巧的想法所驱动。多种影响因素和灵感的融合, 正在不断诠释汽车内饰设计, 风格, 性能和舒适等方面的新的标准。
- 时尚产业正在不断推出新的设计元素, 如质地、纹理、图样、缝法等。汽车设计师探索如何应用产业界的最新成果来完善内饰件的设计。
- 汽车内饰正在成为个性化和创造力的展现。这有利于汽车工业开拓视野, 紧跟流行前沿, 应用新技术, 开发新产品和新工艺。
- 不仅今天的内饰外观看起来像时尚典范, 而且他们在成本, 形式和功能, 耐用性、减轻重量等方面可以满足甚至超越我们行业的需求。所有的这些都需要技术创新。

# Soft TPO Applications

## 会议 1: 软热塑性聚烯烃弹性体 (TPO) 的应用

**Presentation #2: Roger Young, Robert Eller,**  
Robert Eller Associates LLC (USA)

### Current and Future Prospects for TPOs and TPEs in Interiors

Compound technology and fabrication methods are enlarging the performance profiles for TPOs and TPEs in interiors. This presentation explores enabling technologies, targets and paths to innovation in interiors, including foams, soft-touch technology, skins, body/glazing seals, mats, and acoustics within the context of a shifting supply chain, globalization, and shifting performance requirements.



**报告 #2: Roger Young, Robert Eller – Robert Eller Associates LLC (USA)**

### 热塑性聚烯烃弹性体和热塑性弹性体在汽车内饰领域的当前应用和发展前景

共混技术和制备工艺极大的改善了 TPOs 和 TPEs 作为汽车内饰件的性能。本报告探讨了通过技术、目标和路径创新,在供应链不断变化、全球化、及产品性能需求的不断变化的大背景下,实现内饰件的技术创新,如发泡材料,软触技术、皮肤、身体/光滑面密封,垫子,和音响等技术。

**Presentation #3: Dan Feeney,**  
Haartz Corporation (USA)

### New Innovations in Moldable TPO Laminates for Automotive Interiors

Automotive Interior skin technologies are constantly evolving to meet the many and ever-changing industry requirements. Innovation has focused on TPO-based materials with a soft haptic, while meeting the increased challenges of chemical resistance and remaining environmentally friendly. Haartz has been at the forefront developing new TPO laminate constructions as solutions to this challenge. By using years of manufacturing expertise, we have created a portfolio of highly engineered materials to form over even the most complex shapes.



**报告 #3: Dan Feeney, Haartz Corporation (USA)**

### TPO 层压制品在汽车内饰件领域的创新应用

汽车内饰表皮技术不断发展以满足多样和不断变化的行业需求。创新主要集中在改善 TPO 材料的触觉体验,但是却不断遇到耐化学性和保持环保友好的挑战。Haartz 公司率先开发出新的 TPO 层压结构技术来解决这一问题。基于多年的加工经验,我们的工程材料产品可以满足制品的复杂形状要求。

# Coatings for Automotive Interiors

## 会议 1: 软热塑性聚烯烃弹性体 (TPO) 的应用

**Presentation #4: Jim Keller,**  
United Paint & Chemical Corporation (USA)

### Design of Automotive Interior Coatings

Coatings for automotive interiors provide improved aesthetics (color harmony, uniform gloss), haptics or tactile sensation (soft touch, smooth and slippery feel), durability (weatherability, scratch and wear resistance), and chemical resistance. This presentation explains why coatings are used and the special challenges in developing coatings for TPOs and engineered polypropylenes. Function of different components of the coatings will be explained in the context of meeting specific end-use property requirements.



**报告 #4: Jim Keller, United Paint & Chemical Corporation (USA)**

#### 汽车内饰涂层设计

汽车内饰涂层增加了美学(颜色和谐、均一的光泽), 触觉或质感(柔软的触摸, 光滑和湿滑的感觉), 耐用性(耐气候性、划痕、耐磨性)和耐化学性。本报告解释了为什么使用涂层以及应用 TPOs 和工程聚丙烯材料作为涂层过程中遇到的特殊挑战。我们将在满足特定性能需求的背景下探讨不同成分在涂层中的功能。

**Presentation #5: John Millea,**  
**Dr. Pravin Sitaram, Kristine Togneri,**  
The Haartz Corporation (USA)

### Overcoming the Challenges Posed by Consumer Products used in Automotive Interiors

As consumers try to resist microbes, the sun, and more, they are transferring chemicals from such products as hand sanitizer and sunscreen to the surface of their vehicle's interior. The molded soft-trim materials in automotive interiors have a new challenge to resist these chemical attacks. To combat the challenge, extensive R&D efforts at Haartz have led to new TPO formulations and lacquers that achieve greater chemical resistance while maintaining a balance between performance, processing, haptics, and environmental responsibility.



**报告 #5: John Millea, Dr. Pravin Sitaram, Kristine Togneri – The Haartz Corporation (USA)**

#### 克服汽车内饰件消费品带来的挑战

由于消费者试图避免微生物, 阳光, 和其它因素, 他们正在把诸如洗手液和防晒霜等化工产品转移到他们汽车里面。汽车内饰中的模塑软制品在抵抗这些化工产品时面临了新的挑战。为了应对这些挑战, Haartz 公司经系统研发, 平衡产品性能、加工、触觉和环境的责任之间的关系, 开发出领先的, 具有耐化学性的 TPO 配方和涂料。

# Coatings for Automotive Interiors

## 会议 1: 软热塑性聚烯烃弹性体 (TPO) 的应用

**Presentation #6: Martin van den Berg,**  
Stahl (USA)

### Development of Global Emission-Compliant Topcoats and Primers for TPO Materials

Days of a “new car smell” are over. VOC emissions are no longer tolerated because of legislation, OEM-specific car interior guidelines (based on toxicology), and consumers. Stahl, a leading manufacturer of coatings for car interior-trim applications, is launching anew series of coating products that not only comply



with the most stringent OEM requirements for emissions and aesthetic and technical performance, but also takes it one step further by introducing coatings with an ongoing and increasing content of renewable raw materials.

### 报告 #6: Martin van den Berg – Stahl (USA)

#### TPO 材料顶漆和底漆全球排放标准的发展

对于“新车味道”喜爱的时期已经结束。由于法律，原始制造商遵循的特定汽车内饰件指南(基于毒理学)，和消费者的要求，对挥发性有机化合物(VOC)的排放量必须加以控制。Stahl 作为汽车内饰涂料的主要制造商，推出了一个新的涂料系列产品，不仅符合最严格的原始制造商的排放要求，以及美学和技术特性要求，而且进一步应用了可再生的原材料。

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# Rigid TPO Compounds

## 会议 3: 硬性 TPO 共混物

**Presentation #7: Dr. Laura Shereda,**  
Asahi Kasei Plastics North America, Inc. (USA)

### Understanding Emissions of PP-Based Resin Compositions

As the world becomes more concerned with air quality and carbon footprint, in the automotive industry OEMs have begun to add emissions criteria to their parts and prints. These tests generally include measurements of odor, fog, and VOCs. Asahi Kasei has performed extensive testing to determine how the results of each test are related to changes in formulation, processing, and molding. This presentation will provide an overview of emissions in polypropylene compounds.



**报告 #7: Laura Shereda 博士 – Asahi Kasei Plastics North America, Inc.**

#### 理解 PP 基树脂成分的排放

随着空气质量和温室气体的排放引起了更多的关注，汽车行业的原始设备制造商（OEM）对于他们自己的产品部件和印刷过程已经开始推行排放标准。这些测试一般包括测量气味、雾和挥发性有机化合物（VOCs）。Asahi Kasei 公司已通过广泛的试验研究，以确定每个试验结果，材料配方，加工过程和模塑成型之间的关系。本报告将概述聚丙烯材料体系的排放。

**Presentation #8: Emily Fu, Alec Lang,**  
Reliable Analysis (Shanghai) Inc. (China)

### Continuous Optimization of Interior Air Quality

As we all know, more and more people are paying attention to vehicle interior air quality. In order to improve the vehicle interior air quality, protect human health, and promote the automobile industry's technical progress, the Chinese government decided to revise the standard GB/T 27630-2011 and convert it to a compulsory standard. The new draft, published on Jan. 2016 shows much stricter requirements. This presentation will focus on the different emission tests and the change in emission requirements over time.



**报告 #8: Emily Fu, Alec Lang – Reliable Analysis (Shanghai) Inc. (China)**

#### 持续优化车内空气质量

越来越多的人开始关注车厢内空气质量。中国政府为了改善车内空气质量，保护乘驾车人员的健康，并且改进汽车工业的生产工艺，重新制定了新的国家标准（GB/T 27630-2011），并强制执行。2016年1月，新出台的草案更为严格。本报告将关注不同的排放测试和排放标准的变化。

# Rigid TPO Compounds

## 会议 3: 硬性 TPO 共混物

**Presentation #9: Dr. Linda Havermans,**  
SABIC (The Netherlands)

### Meeting the Challenge of Delivering Global PP Compound Solutions

Today, automotive OEMs demand higher performance from PP compounds to successfully address key challenges (i.e., enhanced aesthetics, safety, and weight reduction). OEMs also demand global grades that are readily available locally. Global grade design is complex and challenging because of regional differences



in raw material profiles. However, globally unified PP compound performance profiles can be achieved, as this presentation will demonstrate, by focusing not only on material compositions, but also properties critical to success.

### 报告 #9: Linda Havermans 博士- SABIC (The Netherlands)

#### 实现 PP 共混物全球运输的解决方案

今天, 汽车的原始设备制造商对 PP 共混物的性能提出了更高的要求(例如, 既要注重美观, 改善安全性, 也要考虑产品减重)。原始设备制造商也要求实现在当地购买全球化的原材料。由于原材料的地区差异性, 实现全球产品等级的设计是复杂的和具有挑战性的。然而, 正如本报告所展示的, 通过关注材料组成和产品性能, 可以在全球范围内实现 PP 共混物性能的统一标准。

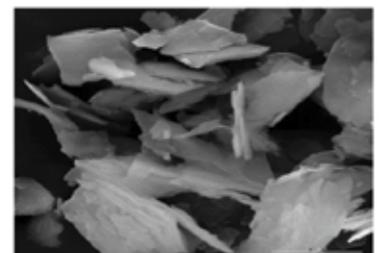


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**Questions?**

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# Lightweight Technologies - Part 1

## 会议 4: 轻质技术-第 1 部分

**Presentation #10: Marco Pan,**  
Trinseo Automotive (France)

### Enable Lighter Designs: The *Renault Espace* Full TPO Liftgate

In a joint project, Renault and Trinseo developed a full thermoplastic liftgate solution, which was commercialized and implemented on the serial production of the 2015 *Renault Espace*. The solution involved replacing metal with plastic on a key vehicle component. The innovative aspect was the use of a single thermoplastic material with different fillers for a mono-material liftgate. The final design achieved optimal dimensional stability, which had been considered the main challenge.



#### 报告 #10: Marco Pan – Trinseo Automotive (France)

#### 启用更轻的设计: Renault Espace 全 TPO 掀背式车门

在一个联合项目中, 雷诺和 Trinseo 开发了一个全热塑性塑料掀背式车门的解决方案, 这个方案已经商业化并应用在 2015 雷诺埃斯佩斯系列产品上。该方案在车辆一个关键部件上实现用塑料替代金属。创新点在于应用含有不同填料的热塑性塑料实现了制备单一材料的掀背式车门。最终的设计突破挑战, 实现了产品的尺寸稳定性。

**Presentation #11: Dr. Linda Havermans,**  
**Bhuneesh Kumar,**  
SABIC (the Netherlands)

### Achieving Weight Reduction and a Balance of Properties with PP Compounds in Both Interior and Exterior Applications

The automotive industry is challenged to remove weight to improve fuel efficiency and reduce tailpipe emissions. Smart design, like ribbing, can get weight out in semi-structural plastic parts, but not in less structural parts produced from PP compounds. For some interior parts, a challenge is to achieve low temperature impact resistance while maintaining (or even increasing) stiffness without processing penalties. This presentation provides innovative approaches to save weight, with minimal tradeoffs, and an excellent property balance.



#### 报告 #11: Linda Havermans 博士, Bhuneesh Kumar – SABIC (The Netherlands)

#### 实现聚丙烯复合物内饰和外饰产品的减重与性能的平衡

汽车工业正在试图通过减少车重来提高燃料的利用率, 同时减少尾气排放。一些针对聚丙烯复合物的巧妙设计, 如肋板, 能够有效减轻半结构件的质量, 但是在结构件上却无法实现。对于一些内饰产品, 在保持甚至提高产品强度的同时提高其抗低温冲击能力依然是一项难题。本研究提供了一种创新方法, 以极少的成本达到了减重和优良性能的平衡。

# Lightweight Technologies - Part 1

## 会议 4: 轻质技术-第 1 部分

**Presentation #12: Dr. Laura Shereda, Vaibhav (Vive) Apte,**  
Asahi Kasei Plastics North America, Inc. (USA)

### New Developments in Talc and Cellulose Fiber-Reinforced PP for Automotive Interior Trim Weight Savings

Asahi Kasei Plastics has recently developed several new PP compounds based on cellulose fiber and/or that also include high flow, strength and stiffness talc-filled PP grades. These provide equivalent performance at reduced weight. The use of



these new PP compounds that provide an equivalent level of stiffness with lower carbon footprint will be discussed in the context of material replacement to achieve a value / performance proposition.

**报告 #12: Laura Shereda 博士, Vaibhav (Vive) Apte - Asahi Kasei Plastics North America, Inc. (USA)**

### 应用滑石粉和纤维素增强并轻量化聚丙烯内饰产品的最新发展

近期 Asahi Kasei 塑料公司利用纤维素改性生产出一些新型 PP 共混物, 其中包括滑石粉填充的高流动、高强度和刚度的 PP。这些材料能够在减重的同时提供与普通 PP 同样的性能。本文从如何替代传统材料这一观点出发, 研究了这种高性能、低碳释放量的 PP 的强度。



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# Lightweight Technologies - Part 2

## 会议 5: 轻量化技术-第二部分

**Presentation #13: [Dr. David Brands,](#)  
[Angel Yanev,](#)  
SABIC (The Netherlands)**

### Weight Reduction Technologies for Long Glass-Reinforced Polypropylene

Semi-structural plastic parts, such as front-end module carriers, are typically designed using complex geometrical shapes and ribbing to help take weight out. For less structural parts (i.e., instrument-panel carriers, door modules, etc.), mass reduction is usually achieved by reducing lowering wall thickness or density (such as by using foamed parts). This study compares different weight reduction technologies — chemical foaming, physical foaming, and thin-wall compact injection molding — applied to a long-glass fiber-reinforced PP composite resin to help define optimal performance.



**报告 #13: [David Brands 博士,](#) [Angel Yanev –](#)  
[SABIC \(The Netherlands\)](#)**

#### 长玻纤增强 PP 体系的减重技术

一些半结构塑料部件，如车前端模块载体，通常利用复杂的几何外形设计和肋板来减轻重量。而对于少数结构件（如仪表板和车门等）则是利用减少壁厚和降低密度（如利用发泡制品）来达到减重的目的。本研究对比了不同减重方法（化学发泡，物理发泡和薄壁注塑成型）在长玻纤增强 PP 共混物体系中的优化效果。

**Presentation #14: [Dr. Laura Shereda,](#)  
[Tom Howie,](#)  
Asahi Kasei Plastics North America, Inc. (USA)**

### Welding Improvements with a Focus on High Strength Glass-Reinforced Polypropylene

Historically, welding of semi-crystalline polymers is more difficult than with amorphous polymers. When we determine the total strain energy of the material, we can greatly increase the strength of the weld. Strain energy optimization will be investigated by looking at several welding parameters and the composition of the material.



**报告 #14: [Laura Shereda 博士,](#) [Tom Howie -](#)  
[Asahi Kasei Plastics North America, Inc.](#)  
[\(USA\)](#)**

#### 高强度玻纤增强 PP 体系焊接技术的改进

半结晶高分子的焊接一般比非结晶高分子要困难。当确定了材料的总应变能，我们就能够大幅度提高材料的焊接强度。本文通过研究不同的材料组分和焊接参数，进而优化材料的总应变能。

# Lightweight Technologies - Part 2

## 会议 5: 轻量化技术-第二部分

Presentation #15: Piergiorgio Ercoli Malacari,  
IMI Fabi SpA (Italy)

### HVT Extra: Introducing a New Talc for Best Performance Tradeoffs

IMI Fabi has developed a new product (HVT Extra), which is a highly delaminated talc that provides outstanding stiffness when compared to standard micronized talc normally used in TPO compounds. Large platey particles ensure very-high rigidity in polyolefins using the new filler, while retaining other mechanical properties.



The innovative compaction process used to produce the new product enables a truly free-flowing, dust-free powder in every condition and does not show any bridging or funneling during handling. Performance results with the new product in conventional TPO compounds will be compared with standard talc solutions to demonstrate potential applications.

#### 报告 #15: Piergiorgio Ercoli Malacari – IMI Fabi SpA (Italy)

#### HVT Extra: 一种平衡基体最佳性能的新型滑石粉填料

IMI Fabi 生产出一种高度分层的滑石粉 (HVT Extra), 与复合在 TPO 中的传统微粒滑石粉相比, 这种材料能够提供更好的强度。利用这种大颗粒的滑石粉, 聚烯烃能够在维持其他力学性能的同时达到非常高的强度。生产该产品所应用的创新压缩方法也保证了整个生产过程无流动、无粉尘且便于操作, 并且该型填料不易形成架桥。通过对常用滑石粉改性的 TPO 的性能进行比较, 进一步证实了 HVT Extra 的潜在应用价值。



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# Material Developments - Part 1

## 会议 6: 材料发展-第 1 部分

**Presentation #16: Dr. Sam He,**  
Inteva Products LLC (USA)

### Discussion of Thermoplastic Concentrates / Additives and Automotive Interior Applications

Thermoplastic concentrates / additives are needed for material properties and processing, and for product functions and performance. This presentation discusses some key requirements and essential expectations for concentrates / additives and their suppliers. The discussion includes additives, processing aids, color and colorants, surface appearance quality of final components, and the end-user's experience. The presentation covers the expectations of automotive-interior business trends, innovation, cooperation in development, supply quality, and delivery, etc.



**报告 #16: Sam He 博士 – Inteva Products LLC (USA)**

#### 热塑性填料/添加剂在汽车内饰产品中的应用

热塑性填料/添加剂常用来改善原材料和制品的性能和加工条件。本研究讨论了针对热塑性添加剂的关键要求，除了添加剂本身和供应商，还包括加工助剂，色母料，制品表面质量和用户体验。此外，本研究也展示了汽车内饰制品的趋势、创新、供应链质量和运输等方面的发展。

**Presentation #17: Jungdu Kim, J. Mara, T. Schmutz, HeeJung Kwon, K. Keck, B. Iyer,**  
Songwon Industrial (South Korea)

### UV Product Developments for TPO Automotive Applications

This presentation will begin by providing an overview of the photo-degradation and light stabilization of polyolefins and the chemistry and structure-activity relationships in hindered amine light stabilizers (HALS). It will end with the introduction of new synergistic UV stabilizer packages developed in partnership with Sabo to achieve increasing performance demands in the outdoor weathering of polyolefin-based applications, particularly automotive TPO components for interior and exterior.



**报告 #17: Jungdu Kim, J. Mara, T. Schmutz, HeeJung Kwon, K. Keck, and B. Iyer – Songwon Industrial (South Korea)**

#### 紫外光处理 TPO 汽车制品的研究进展

本文首先回顾了聚烯烃制品的光降解性和光稳定性，以及使用阻氨光稳定剂 (HALS) 后 TPO 化学性能和结构活性的关系。最后展示了与 Sabo 合作开发的新型紫外光稳定剂满足聚烯烃在户外的应用条件，特别适用于汽车内外饰制品。

# Material Developments - Part 1

## 会议 6: 材料发展-第 1 部分

Presentation #18: [Şerif Erdoğan](#),  
[Şebnem Tayyar](#), [Can Ozer](#),  
Elastron Kimya (Turkey)

### Mechanical-Physical and Weathering Properties of New "MATT SEBS" Series for Weatherseal Applications

This presentation discusses the mechanical-physical, rheological, and weathering properties of non-crosslinked "MATT SEBS" compound, which is designed as an alternative to EPDM/PP and crosslinked TPE-S. EPDM/PP-based thermoplastic vulcanizate is mainly used as a material for different types of automotive weatherseal applications, including beltline seals and glass-run channel seals. The new high-performance MATT SEBS-based compounds have competitive properties, including lower compression set at higher temperature, low gloss value, good weathering resistance, higher physical and mechanical properties, and similar flow properties with EPDM/PP.



报告 #18: [Şerif Erdoğan](#), [Şebnem Tayyar](#),  
[Can Ozer](#) –Elastron Kimya (Turkey)

### 新型 "MATT SEBS" 复合物的机械-物理和耐候性能以及其在汽车密封条上的应用

为了替代 EPDM/PP 和交联 TPE-S, 本文研究了非交联 MATT SEBS 复合物的机械-物理、流变和耐候性能。基于 EPDM/PP 的热塑性硫化橡胶主要用于汽车密封方面 (包括密封条和玻璃运行通道密封), 而与其加工流动性能类似的新型 MATT SEBS 复合物则拥有更多优势, 如高温成型压力较低, 低光泽值, 更好的耐候性以及物理-机械性能等。



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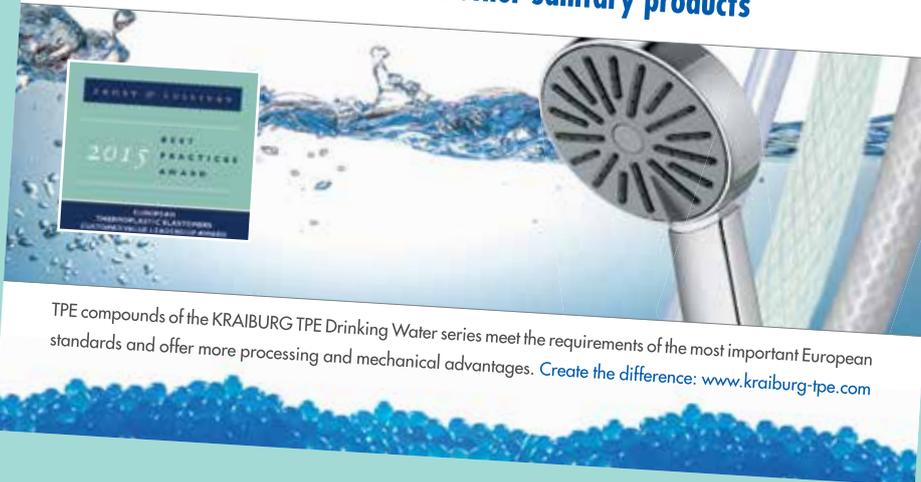
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# Process Development

## 会议 7: 加工工艺的发展

### Presentation #19:

**Professor Lih-Sheng (Tom) Turng,**  
University of Wisconsin–Madison (USA)

### Recent Developments of Microcellular Injection Molding

Injection molding with microcellular plastics is capable of producing parts with excellent dimensional stability while using less material and energy, lower injection pressure, and a shorter cycle time. As a result, microcellular injection molding has found broad applications in automotive products, business equipment, and various industrial applications and is applicable to TPO materials. In spite of these advantages, however, wider adoption of this promising process has been limited due to its inherent drawbacks, such as surface defects and inferior mechanical properties compared to conventional solid injection molded parts. This talk will present recent



developments of microcellular injection molding that employs gas-laden and ready-to-foam pellets to realize mass production of foamed injection molded parts and co-blowing agents as well as microcellular nanocomposites and blends that offer improved mechanical properties or ductility using the microcellular injection molding process.

### 报告 #19: Lih-Sheng (Tom) Turng 教授, University of Wisconsin–Madison (USA)

#### 微孔发泡注射成型的发展近况

微孔发泡注射成型技术能够利用较少的材料和电能、较低的注射压力以及较短的成型时间生产出具有良好尺寸稳定性的发泡产品。因此，微孔注射成型技术在汽车制品、商业设备和许多工业应用中得到应用，该技术同样适用于TPO材料。尽管优点突出，但与固体注塑制品相比，微孔发泡制品固有的表面缺陷和较弱的力学性能在某种程度上限制了该技术的广泛应用。本报告将探讨最新的预发泡粒料技术，多种物理发泡剂技术，以及纳米复合材料技术在微孔发泡注射成型过程中的应用，极大地改善了发泡制品的机械性能和延展性。

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# Process Development

## 会议 7: 加工工艺的发展

**Presentation #20: Wu Jie,**  
JSR (Shanghai) Co. Ltd. (China)

### Bonding Properties & Structure between TPVs and EPDM Vulcanizates for Automotive Profiles

Compared with cured rubber, olefinic-based thermoplastic vulcanizate (TPV) elastomers offer both cost savings (using less labor at higher process efficiency) as well as environmental benefits (due to lower carbon emissions and low mass). A new TPV grade (EXCELLINK) has been developed by optimizing the polypropylene matrix to have lower crystallinity and higher molecular weight. In this presentation, test results will be reviewed to show that the new material provides excellent adhesion to cured rubber, compression set, friction durability, and soft feel in an automotive door weather seal application.



**报告 #20: Wu Jie – JSR (Shanghai) Co. Ltd. (China)**

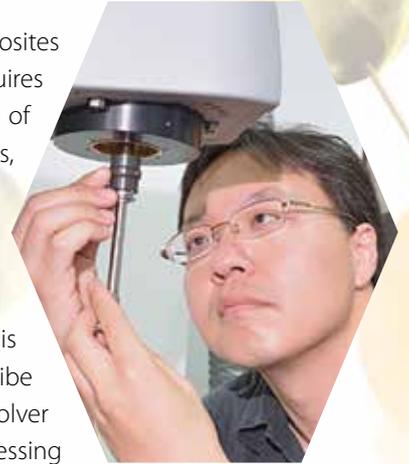
#### 热塑性硫化橡胶 (TPVs) 和 EPDM 硫化胶汽车制品的粘接性能与结构

与固化橡胶相比，烯烃基热塑性硫化橡胶弹性体 (TPVs) 成本低廉 (使用较少的劳动力便能达到较高的生产效率) 且环保 (碳排放总量较低)。通过优化聚丙烯基体的低结晶度和高分子量，一种新级别的 TPV (EXCELLINK) 已经被生产出来。研究数据表明，这种 TPV 生产的车门用密封条产品，与固化橡胶具有优良的附着力，抗压缩变形，耐磨性和触觉感良好。

**Presentation #21: Dr. Shih-Po (Tober) Sun -**  
CoreTech System Co., Ltd. (China)

### Simulating Composite Manufacturing with Moldex3D

The success of composites simulation requires an understanding of material properties, process mechanisms, and simulation integration between design, analysis, and manufacturing tools. This presentation will describe how the Moldex3D solver tackles different processing techniques, and how the lab characterizes thermal and flow properties of the materials.



**报告 #21: Shih-Po (Tober) Sun 博士- CoreTech System Co., Ltd. (China)**

#### Moldex3D 软件在复合材料加工过程模拟中的应用

成熟的复合材料模拟需要理解材料的性能，加工机理，以及设计、分析和加工设备间的一体化模拟。本报告将介绍 Modex3D 软件是如何处理不同加工工艺和如何确定材料的热和流动性能的。

# Modeling & Measurement of Scratch Resistance

## 会议 8: 耐划伤性能模型构建及测试表征

Presentation #22: M. Jamali, R. Bagheri, O. Dadgari, A. Ghasemi, Parsa Polymer Sharif Co. (Iran)

### Correlating Scratch Visibility with Mechanical Behavior of TPO Compounds

Goal of the current research is to better understand the role of the plastic matrix on scratch visibility in common formulations for interior trim. Two different compounds including a PP-elastomer and a PP-elastomer-filler were utilized. These materials could represent automotive door-panel and instrument-panel compounds, respectively. Scratch visibility on the grained surface was evaluated and correlated with the observations made in tensile, bending, and hardness testing of the compounds. Scratch path was analyzed using optical and scanning-electron microscopes. Strain at yield and stress whitening of the polymer were found to have considerable effects on scratch visibility.



**报告 #22: M. Jamali, R. Bagheri, O. Dadgari, and A. Ghasemi – Parsa Polymer Sharif Co. (Iran)**

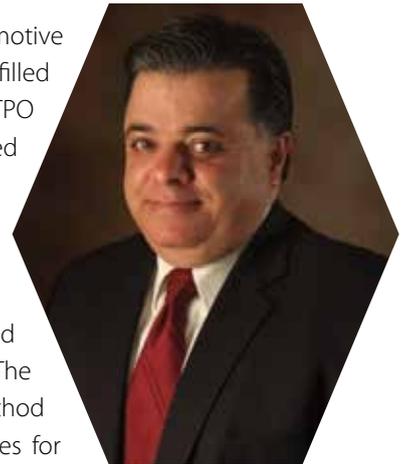
#### TPO 复合材料的耐划伤可见性和力学性能之间的关系

当前研究的主要目标是为了更好地理解汽车内饰通常所用的材料配方中聚合物基质对其耐划伤性能的影响。研究了聚丙烯弹性体和聚丙烯弹性体填料两种复合材料体系，它们分别是汽车门板和仪表盘所常用的材料体系。通过拉伸、弯曲和硬度测试，对纹饰表面的耐划伤可见性进行表征。通过光学显微镜和电子显微镜观察分析了划痕的发展过程。结果发现聚合物屈服应变和应力发白过程对材料的耐划伤性能有极其重要的影响。

Presentation #23: Dr. Sassan Tarahomi, International Automotive Components Group (USA)

### TPO Scratch & Mar Predictability - Part 1: Simulation

Materials used in automotive interiors include many filled and unfilled PP and TPO grades. With increased competition and materials improvement, customers expect much better performance for the interior materials used in their cars. The traditional method of testing grained plaques for scratch and mar does provide directional performance data but is very time consuming. This presentation discusses scratch and mar predictability for PP and TPO products by utilizing CAE analysis.



**报告 #23: Sassan Tarahomi 博士 - International Automotive Components Group (USA)**

#### TPO 耐划伤和擦伤性能预测 - 第一部分: 模拟

汽车内饰所用的材料包括有填料或者纯的聚丙烯和 TPO。随着日益加剧的竞争和材料的日新月异，客户对汽车内饰所用材料的性能要求越来越高。传统的测试划伤和擦伤的方法确实能够提供指导性的性能数据，但是却极其耗时。该报告研究了如何通过 CAE 软件分析 PP 和 TPO 产品的耐划伤和擦伤性能。

# Modeling & Measurement of Scratch Resistance

## 会议 8：耐划伤性能模型构建及测试表征

**Presentation #24: Dr. Sassan Tarahomi,**  
International Automotive Components Group (USA)

### TPO Scratch & Mar Predictability - Part 2: Building the Surface-Characteristic Database

This presentation is a continuation of the information presented as Part 1: Simulation. The FEA method is used to analyze surface damage by scratch and mar. The scope of this presentation is to present the extensive work completed in building the database. Scan



and discretization of interior automotive surface textures and further discussion in the accuracy of simulation versus physical testing with confirmation runs are discussed in this paper.

### 报告 #24: Sassan Tarahomi 博士- International Automotive Components Group (USA)

#### TPO 耐划伤和擦伤性能预测 - 第二部分：构建 表面-性能数据库

本报告是第一部分：模拟部分的延续，通过 FEA 方法分析表面划伤和擦伤。报告的主要内容是展示在构建数据库过程中的大部分工作。本文主要对汽车内饰表面纹理进行扫描和离散分析，并通过实验和模拟结果的对比来验证分析模拟的准确性。



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# Surface Enhancements

## 会议 9: 表面强化

**Presentation 25: Jerry Luo,**  
Kingfa Science & Technology Co. Ltd. (China)

### Innovative Compounded TPO Materials for Automotive Applications

A series of innovative polypropylene material solutions have been developed to meet automotive lightweight and environmental-protection requirements. These technologies include high-flow grades for thin-wall applications, low-density, long-fiber-reinforced, low-emission, anti-scratch, bloom-free, and tacky grades, soft-touch materials, imitation-flocking grades, and paint-free materials among others. This presentation will discuss validation of these materials on automotive parts with a focus on part-design optimization, CAE analysis, process capability, and part testing.



**报告 #25: Jerry Luo, Kingfa Science & Technology Co. Ltd. (China)**

#### 应用于汽车行业的创新复合 TPO 制品

为了解决汽车的轻量化问题和环保需求，一系列针对 PP 材料的改进的工艺应运而生。这些改进的性能包括：生产薄壁制品的高流动性，长玻纤增强，低密度、低碳排放量、抗刮性，触感好，以及免喷漆等性能。本文从结构优化，CAE 分析，成型能力和性能检测等方面，验证新型 PP 在汽车制品中的应用。

**Presentation 26: Voly Wang,**  
Dow Corning (China) Co. Ltd. (China)

### Next-Generation Additives for Scratch Improvement of Auto Interior Talc-Filled Polypropylene Parts

The automotive industry continues to push for parts that are more durable yet environmentally friendly. This presentation discusses the next generation of siloxane masterbatch additives for talc-filled polypropylene compounds designed for automotive interior parts. The technology provides excellent scratch performance at lower dosage levels than previously achieved while minimizing impact on mechanical properties. Additionally they offer the best combination of properties including excellent scratch resistance, long-term heat and UV stability, low fogging, and low VOC generation.



**报告 #26: Voly Wang, Dow Corning (China) Co. Ltd. (China)**

#### 增强滑石粉/PP 内饰制品抗刮性能的新一代添加剂

汽车工业始终致力于更耐用的环保制品的开发。本文讨论了针对滑石粉填充 PP 复合汽车内饰制品的新一代硅氧烷母粒添加剂。少量该添加剂就能够使制品具备良好的抗刮性能，且对制品本身的力学性能影响极低。该添加剂同时也增强了制品在高温和紫外线下的稳定性、抗雾化和 VOC 沉积能力。

# Material Developments - Part 2

## 会议 10: 材料的发展-第二部分

**Presentation 27: Roger Liu,**  
LyondellBasell Industries (China)

### Recent Advances in Soft-Touch Feeling Material

Soft-touch feeling material (Softell) provides high quality finished part surfaces with soft touch and matte surface without painting, as well as excellent scratch resistance and surface robustness. The parts made of these material feature very good noise-dampening properties, and better VOC emission performance on interior parts.

Recent advances in the grades demonstrated further improvements in the soft-touch feeling.



**Presentation 28: Colin Chen,**  
LyondellBasell Industries (China)

### Low VOC Automotive Interior with New Developments on PP Compounds

After the updated regulation release of GB 27630 in early 2016 for automotive cabin hazardous VOC emission control, more and more attention is being given by key tiers and OEMs to this topic. New technology developments in PP compounds for reduction of hazardous VOC emission on interior applications will be discussed in this presentation.



**报告 #27: Roger Liu, LyondellBasell Industries (China)**

#### 软触觉材料的最新进展

软触觉材料 (softell) 提供了高质量精巧的制件表面, 使得制件表面具有柔软触觉和没有着色的无光泽的表面, 同时具有优秀的耐刮伤性和表面坚固性。用这些软触觉材料制成的制件有着非常好的噪音抑制特性, 并且对于汽车内饰件有着非常好的挥发性有机化合物排放特性。最新的发展证明了这种软触觉材料已经得到了很大的改善。

**报告 #28: Colin Chen, LyondellBasell Industries (China)**

#### 低挥发性有机化合物汽车内饰 PP 混合物的新发展

2016 年初发布更新对于汽车驾驶室内有害挥发性有机化合物排放控制 GB 27630 新规则后, 这个话题引起关键的供应商和原始设备制造商们越来越多的关注。关于 PP 混合物在减少汽车内饰有害挥发性有机化合物的排放新技术的发展将在本报告中讨论。