Composites in Future Mobility

复合材料在未来出行的应用
WORLDWIDE LEADER IN ITS 3 BUSINESSES

SEATING 座椅 €7.1 BILLION 71亿欧元

INTERIORS 内饰 €5.4 BILLION 54亿欧元

CLEAN MOBILITY 绿动智行 €4.5 BILLION 45亿欧元
<table>
<thead>
<tr>
<th><strong>HIGHLIGHTS 2017</strong></th>
<th><strong>重要数据</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RMB10 Billion</strong></td>
<td><strong>1个国家</strong></td>
</tr>
<tr>
<td>of total sales</td>
<td><strong>1个国家</strong></td>
</tr>
<tr>
<td><strong>RMB6.6 Billion</strong></td>
<td><strong>1个国家</strong></td>
</tr>
<tr>
<td>value-added sales</td>
<td><strong>1个国家</strong></td>
</tr>
<tr>
<td>100亿人民币销售额</td>
<td><strong>1个国家</strong></td>
</tr>
<tr>
<td><strong>4500 Employees</strong></td>
<td><strong>15个工厂</strong></td>
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<tr>
<td><strong>15个工厂</strong></td>
<td><strong>15个工厂</strong></td>
</tr>
<tr>
<td><strong>520 Engineers &amp; Technicians</strong></td>
<td><strong>1个研发中心</strong></td>
</tr>
</tbody>
</table>

* Value added sales: Total Sales w/o Monoliths
Premium technologies enabling responsible behaviors in a sustainable, connected ecosystem
What is composites?
什么是复合材料？

Matrix + Reinforcement = Composite
基材 + 加强部分 = 复合材料

实例: SMC, LFT, BMC, Carbon glass......

Composite is the combination of materials with different technical characteristics. Mixing those materials bring enhanced characteristics such as stiffness and lightweight.
<table>
<thead>
<tr>
<th>Item</th>
<th>GMT 玻璃纤维增强型热塑性塑料</th>
<th>LFT-D 长纤维增强热塑性材料</th>
<th>LFT 长纤维增强热塑性材料</th>
<th>SMC(BMC) 片(团)状模纤维</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process 工艺</td>
<td>Injection/Compression</td>
<td>Compression</td>
<td>Injection/Compression</td>
<td>Compression</td>
</tr>
<tr>
<td>Density(g/mm$^3$) 密度</td>
<td>1.2</td>
<td>1.2</td>
<td>1.15</td>
<td>1.7（可做到1.3）</td>
</tr>
<tr>
<td>Temperature resistance</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>VOC 车内有机挥发物</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Middle</td>
</tr>
<tr>
<td>Stiffness 刚度</td>
<td>High</td>
<td>Middle</td>
<td>Middle</td>
<td>High</td>
</tr>
<tr>
<td>Impact resistance 耐碰</td>
<td>High</td>
<td>Middle</td>
<td>low</td>
<td>High</td>
</tr>
<tr>
<td>Geometry 尺寸</td>
<td>High</td>
<td>Middle</td>
<td>low</td>
<td>High</td>
</tr>
</tbody>
</table>
我们的客户
目前量产应用车型

商用车
- MAN TGX
- Mercedes Unimog
- Renault Master

乘用车
- Renault Megane
- DS3
- 580
- Peugeot 4008
- Audi A8

运动超跑
- Aston Martin DB11
- Lotus Evora
- McLaren 570 S
- AMG GT Roadster

- Peugeot 4008
- Audi A8
MEGA TRENDS

Emissions Regulation
法规排放

Powertrain Electrification
动力电气化

Future Mobility & Autonomous Cars
无人驾驶
MEGA TREND #1
Emissions Regulation & Smart Cities initiatives
160g CO2/km  
8L/100  
2010

<95g CO2/km  
3L/100  
>2025

180 mg NOx/km  
÷ 5  
35mg NOx/km  
2010

>2025
AIR QUALITY IMPROVEMENT NECESSITY
高质量环境的需求

FAST-GROWING NEED FOR MOBILITY
高速增长的汽车需求

3M people die prematurely every year due to ambient air pollution
每年300万人死于空气污染

Source: World Health Organization, OECD

$175Bn estimated global health cost related to air pollution
每年1750亿美元用于缓解污染

Source: OECD

60% of the worldwide population will live in urban area by 2030 (~55% in 2020)
60%的人口居住在城市区域在2030年

4.9Bn people will be part of the middle class by 2030 (~3.2Bn in 2020)
49亿人将成为中产阶级在2030年

Source: OECD
MEGA TREND #2
Powertrain Electrification

动力电气化
LIGHT VEHICLE POWERTRAIN MIX

混动轻型车

<table>
<thead>
<tr>
<th>Powertrain Type</th>
<th>2018</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel cell</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>BEV</td>
<td>98%</td>
<td>19%</td>
</tr>
<tr>
<td>Hybrid</td>
<td>5%</td>
<td>75%</td>
</tr>
<tr>
<td>Pure ICE</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

2018年混动轻型车的功率组合为98%常规ICE、5%混动车、1%BEV和1%燃料电池车。到2030年，混动轻型车的功率组合预计变为19%BEV、75%混动车和1%常规ICE。
MEGA TREND #3
Future Mobility
CES 2019 | Faurecia systems and User Experiences 佛吉亚系统和用户体验

Cocoon Wellness
Thermal & Wellness - Mahle

Cockpit Intelligence Platform

Advanced Safety
ZF partnership

Cockpit of the Future

Immersive Sound Experience
User experiences aligned with consumer trends

用户体验与消费趋势相一致

- Advanced safety
- Enhanced comfort and wellness
- Personalized climate comfort & air quality
- Immersive sound experience
- Intuitive HMI solutions
- Adaptive cabin
- Cloud-based services
TOWARDS ZERO EMISSION MOBILITY THROUGH 3 DOMAINS OF EXPERTISE

我们关注三大业务板块

- **Lightweight Structures**
  车身轻量化

- **350 / 700 bar high pressure hydrogen storage system**
  燃料电池：高压储氢系统

- **Battery pack for BEV and PHEV**
  BEV和PHEV电池包的集成和轻量化
INTRODUCING NEW POTENTIAL FOR COMPOSITE APPLICATIONS

COMPOSITE CROSS CAR BEAM
复合材料仪表板横梁

COMPOSITE SEAT FRAME AND CUSHION
复合材料座椅骨架和骨盆

COMPOSITE DISPLAY FRAME FOR ALWAYS LARGER SCREENS
复合材料显示屏支架

VISIBLE CARBON DECO PART
可视的碳纤维装饰件

INTRODUCING NEW POTENTIAL FOR COMPOSITE APPLICATIONS
潜在的复合材料应用在未来汽车上
**Display Frame for large screen 大显示屏支架**

**Replacement of Al or Mg die cast solution 取代镁铝合金的方案**

### benefits

- **Up to 25% weight saving 减重25%**
- **Part price cost reduction: up to 15% 价格 减少15%**
- **Tooling cost reduction: up to 40% 模具成本降低40%**

### technical description

- **High performance Carbon SMC for structural applications 碳纤维SMC**
- **Materials capacities available 材料能力**
  - **Reinforcement: Carbon, Glass, Mixed, 碳纤，玻纤或混合**
  - **Matrix: Epoxy, Vinylester, Polyester 树脂: 环氧树脂、乙烯基酯、聚酯**
- **Percentage of fiber in mass: up to 60 % (fabric or chopped fibers) 纤维含量可达60%**
- **Thickness: ≤ 1.5 mm vs. 3 mm on die cast part 厚度小于1.5 mm vs. 3 mm on die cast part**

### applications

- **Parts: Semi-structural 半结构件**
- **Status: RFQ on going 正在报价**
- **Annual volume: From 5kvh to 100Kvh/year 年产量: 5kvh to 100Kvh/year**
**BENEFITS**

- Seat pan for individual rear seat
- Do the interface between the frame, foam and accessory
- Weight saving: -40% compared to steel
- Function integration: 9 steel part replace by one in composite
  - Tooling saving of 40%

**TECHNICAL DESCRIPTION**

- Organo sheet PA6 + 63% continuous glass fiber
- Overmoulding with PA6 + 30% GF
- Stamping + overmolding in one step

**APPLICATIONS**

- Serial production (FAS)
- Vehicle: A8
- OEM: Audi
**BENEFITS**

- **Lightweight**: VS. metal part -30%
  - 轻量化：和金属比减重30%
- **Physical Property**: Good impact resistance, strength is two times as injection part
  - 性能：耐冲击性好，强度是注塑件的两倍
- **Low air resistance** 低空气阻力

**TECHNICAL DESCRIPTION**

- **Controllable length of glass fiber** 可控的玻纤长度
- **Thermoplastic material** 热塑性材料
- **Process is LFT-D (Long-Fiber Reinforce Thermoplastic Direct)**
  - 使用长玻纤在线合成法生产

**APPLICATIONS**

- **Serial production for PSA 308/408/2008/C3 量产项目**

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**Faurecia Composites Solutions 佛吉亚复合材料解决方案**

**Composite Engine Cover 发动机下护板**
**BENEFITS**

- **Lightweight:** VS. metal part -20~30%
  
  轻量化：和金属比减重20%~30%

- **Physical Property:** 性能
  
  Better than injection part 与注射件比较:
  
  - Tensile strength increase 20% 拉伸强度提升20%
  - Bending strength increase 12% 弯曲强度12%
  - Charpy notched impact increase 5 times 缺口冲击

- **Cost down 10%** 成本减少10%

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**TECHNICAL DESCRIPTION**

- **Product is assembled in the engine bay. The hook loch is assembled on it** 零件功能集成性

- **Process is LFT-D (Long-Fiber Reinforce Thermoplastic Direct), Material is PP+GF30** 使用长玻纤在线合成法生产，材料是PP+GF30

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**APPLICATIONS**

- **Serial production for DPCA 408/308 量产项目**
**Benefits**

- **Lightweight**: VS. metal part -10%~20%  
  轻量化：和金属比减重10%~20%

- **Physical Property**: Modulus is the same as metal but strength is 4 times as metal  
  性能：模量和金属相当，但是强度比金属强4倍

**Applications**

- Serial production for DPCA C5/C6/508 量产项目

**Technical Description**

- The product integrated. 零件/功能集成
- High temperature resistant 耐高温性能
- Geometry is stability 尺寸稳定
**BENEFITS**

- **Lightweight:** -30% vs. steel spare wheel tray (~2.5kg)
  - 轻量化：比钢制备胎托盘重量减30% (~2.5kg)
- **Design freedom:** Conception shape freedom 设计自由度
- **Ergonomic:** Better efficiency on the production line
  - 人机工程学：高效生产线

**TECHNICAL DESCRIPTION**

- Sheet Molding Compound (SMC) process 片状成型塑料及工艺
- Thermoset polyester resin 热固聚酯树脂
- Glass fibers reinforced (short fibers 25mm) 玻璃纤维加强材料 (短纤25mm)
- Optimized & automatized SMC manufacturing process 优化的全自动SMC加工工艺

**APPLICATIONS**

- **Serial production since 2015** 2015年量产
- **Vehicle:** Mégane / Scenic 车型：梅甘娜/风景
- **OEM:** Renault 主机厂：雷诺
Faurecia Composites Solutions 佛吉亚复合材料解决方案
Rear End BIW panels 后端白车身板

**BENEFITS**

- High design freedom and function integration
  高设计自由度和功能集成
- Complete Rear End Composites Structure made of only 6 panels:
  仅由6块面板构成的完整的后端复合材料结构件
  - Rear Quarter Inners / Panel Trunk Closures / Panel Floor Trunk / Trunk Lid Surround.
- SMC low pressure process allows tooling cost decrease ~30%
  SMC低压工艺降低了模具成本~30%
- Lower tooling investment than metal solution
  模具投资低于金属解决方案

**TECHNICAL DESCRIPTION**

- Applicable Materials: 材料应用
  - Reinforcement: Glass 玻纤加强
  - Matrix: Thermoset (low density Polyester) 热固性塑料
- Process: Sheet Molding Compound (SMC) SMC工艺
- Delivered primed, ready to be body-color painted
  交付时涂有底漆，已准备好涂车身颜色

**APPLICATIONS**

- Serial Production 量产
**Faurecia Composites Solutions 佛吉亚复合材料解决方案**
Exposed Carbon Roof 碳纤顶盖

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**BENEFITS**

- **Weight saving** up to 60% vs. steel equivalent (-3.1 kg)
  - 与钢比，重量减少60% (-3.1 kg)
- **Torsional rigidity** can be raised up to 25% vs. metal
  - 与金属比，扭转刚度+25%

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**TECHNICAL DESCRIPTION**

- **Material**: Thermoset 热固性塑料
- **RTM process** RTM工艺
- **3k carbon Twill 2x2 finish 3K 碳斜纹 2x2 抛光**
- **Manual polishing** 手工抛光

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**APPLICATIONS**

- **Serial Production** 量产
Validate and implement a 50% weight saving breakthrough / Skid Plate / based of high performance composite material (Carbon, Glass) 验证和实施50%重量节省突破/滑板/基于高性能复合材料（碳纤维，玻璃纤维）

- Provide weight savings of 10 kilos 减重10公斤
- Reduce CO₂ emission (Regulation) 减少CO₂排放

**technical description**

- RTM 树脂传递模塑成型工艺
- Continuous carbon fiber 连续碳纤维增强
- Fabric 织物

**applications**

- New content 新产品
- Vehicle: Off-road 4WD 全路况4驱
- SOP: 2-3 years 量产2-3年
**BENEFITS**

- **Weight saving** up to 55% vs. metal equivalent 与金属比，重量减少55%
- **Weight saving** up to 35% vs. glass fiber reinforced SMC 与玻纤加强SMC材料比，重量减少35%
- **Physical Properties**: High stiffness (compared to standard glass SMC) 物理性能：高硬度（与标准玻纤SMC相比）
- Function integration and design freedom 功能集成和设计自由度
- Low volatile organic compounds (VOC) for interior parts 内部零件用低挥发性有机化合物

**APPLICATIONS**

- Serial Production 量产
- OEM 主机厂: Mercedes 梅赛德斯
- Vehicle 车型: AMG range

**TECHNICAL DESCRIPTION**

- **Applicable Materials**: 材料应用
  - Reinforcement: Carbon 碳纤加强
  - Matrix: Thermoset (Epoxy resin, Vinylester, Polyester) 热固性塑料
- High fiber content: 40% to 60% 高纤维含量：40% 到60%
- Process: Sheet Molding Compound (SMC) SMC工艺
- Short production cycle time of 1 Part / 90 s 短的生产时间：90秒/件
Faurecia Composites Solutions 佛吉亚复合材料解决方案
Composite Rear Diffuser 复合材料后扩散板

**BENEFITS**

- **Air flow managed through specific design of blades**
  通过特定的叶片设计管理气流
- **Good thermal behavior vs exhaust system environment**
  良好的热性能与排气系统环境
- **Thin blade design 薄叶片设计**
  - Thinner than thermoplastic 比热塑性塑料薄
  - Metal equivalent is not stampable out of one sheet 金属件无法一次冲压成型

**TECHNICAL DESCRIPTION**

- **Applicable Materials: 材料应用**
  - Reinforcement: Glass 玻纤加强
  - Matrix: Thermoset (Polyester) 热固性塑料
- **Share of reinforcement fibers up to 25% 增强纤维的份额高达25%**
- **Process: Sheet Molding Compound (SMC) SMC工艺**

**APPLICATIONS**

- **Serial Production 量产**
- **Vehicle 车型: ALPINE A110**
Faurecia Composites Solutions 佛吉亚复合材料解决方案
Thin Thickness high-performance SMC (Load floor) 薄的高性能SMC载重地板

**BENEFITS**

- **Lightweight:** -27% vs. standard SMC load floor (1.5mm thickness vs 2.5mm)
  轻量化：与标准化SMC地板比重量减少27%（1.5mm厚度 vs. 2.5mm厚度）
- **Design freedom:** Conception shape freedom 设计自由度
- **Mechanical performance:** high performance reinforcement with chopped fiber + local patches of continuous fiber to address superior mechanical performances where needed
  机械性能：通过短波纤+连续纤维实现高的性能加强

**TECHNICAL DESCRIPTION**

- **Fibers reinforcement:** 纤维加强
  - Chopped glass fibers or chopped carbon fibers (25mm length / 50-60% in mass)
    短波纤或短碳纤(25mm长 / 50%~60%的含量)
  - Continuous glass fiber or twill carbon fiber (60% in mass)
    连续玻纤或斜纹碳纤（60%的含量）

**APPLICATIONS**

- Semi-structural / structural parts 半结构件 / 结构件
- SOP: 0-1 year SOP: 0-1
T-RTM Process:

- T-RTM process: injection of reactive polyamide into a mold with a dry preform (in situ polymerization).
- Thermoplastic resin (PA6) Thermoplastic resin (PA6)
- Dry chopped fiber material (carbon) processed by Direct Fiber Projection
- Production of net shape parts

**Benefits**

- **Recyclability:** Thermoplastic resin (PA6) PA 6可回收
- **Cost saving:** Reduced raw material price: use of dry fibers and monomers instead of semi-finished products.
- **Mass production:** Short and repeatable process: cycle time of 120 seconds 大规模生产: 工艺简单：节拍120秒

**Technical Description**

- **T-RTM process:** injection of reactive polyamide into a mold with a dry preform (in situ polymerization).
- **Thermoplastic resin (PA6):** Thermoplastic resin (PA6)
- **Dry chopped fiber material (carbon):** Dry chopped fiber material (carbon) processed by Direct Fiber Projection
- **Production of net shape parts:** Production of net shape parts

**Applications**

**Ready for RFQ:** 可以开始报价
**Applications:** Semi-structural & Structural parts

- **Validation prototype part:** 样件验证
- **Preform for the prototype part:** 样件的性能表现
- **Straight fiber bundles:** 高机械性能和高渗透性

**Cost saving:**

- **Reduced raw material price:** use of dry fibers and monomers instead of semi-finished products.

**Mass production:**

- **Short and repeatable process:** cycle time of 120 seconds 大规模生产: 工艺简单：节拍120秒
Optimized Packaging 优化整包
Lightweight Technology 轻量化
Increased Function Integration 增强功能集成
Highly Efficient Thermal System 高效的热管理系统
Crash and Road Debris Protection 碰撞和路上碎石保护

BATTERY PACK TECHNOLOGY
电池技术

Composite Upper Housing 复合材料电池上盖
Module Integration 模组集成
Structural Hybrid (Composite + Alu) Bottom Housing 复合材料+铝的下盖解决方案
BEV Battery Top cover 纯电动汽车电池上箱体

Lightweight and low cost part for mass production lines
适合大批量生产的轻量化和低成本产品

**Benefits 优势**

- **Weight Reduction 减重**
  - 40% vs. Steel & 25% vs. Al (-4~8 kg)
- **Design freedom 设计自由度**
- **Fitting with large size and complex packaging 可适应大尺寸复杂的电池箱体**
- **Easiest assembly and sealing 更容易密封和装配**
- **Reduced total cost 总成本的减少**
- **Part price & tooling 零件成本和模具成本**

**Technical description 技术特征**

- 碟形模压成形工艺 Sheet Molding Compound (SMC) process
- 玻纤或碳纤增强 Glass fibers or Carbon fibers reinforced
- 自动化生产工艺 (激光切割) Automatized SMC manufacturing process (Laser cutting)
- 耐腐蚀 Corrosion free
- 可定制机械性能 Mechanical involvement
- 热管理 (优良的绝缘性能) Thermal management (insulation)

尺寸: 2.2m *1.3m*0.3m

**Applications 应用**

应用车型：Nissan, Honda, PSA BEV

应用车型：纯电动车型

年量产: 2019

自2019年量产以来，适合大批量生产的轻量化和低成本产品

- **innovation 创新**
- **ready for RFQ 准备中**
- **serial production 批量生产**
# Battery Top cover 电池上箱体

Lightweight and low cost part for mass production lines
适合大批量生产的轻量化和低成本产品

## Benefits 优势

<table>
<thead>
<tr>
<th>Weight Reduction 减重</th>
</tr>
</thead>
<tbody>
<tr>
<td>-40% vs. Steel &amp; -25% vs. Al (-2.0~3.0 kg)</td>
</tr>
<tr>
<td>-40% vs 钢材 &amp; -25% vs. 铝合金 (-2.0~3.0 kg)</td>
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## Technical description 技术特征

- Sheet Molding Compound (SMC) process 片状模塑料模压工艺
- Glass fibers or Carbon fibers reinforced 玻纤或碳纤增强
- Automatized SMC manufacturing process (Laser cutting) 自动化生产工艺(激光切割)
- Corrosion free 耐腐蚀
- Mechanical involvement 可定制机械性
- Thermal management (insulation) 热管理（优良的绝缘性能）

## Applications 应用

Mass production since 2018 2018年投产

Applications: Dong Feng Xiao Kang 580, JMC

应用车型：东风小康580，JMC等车型

innovation | ready for RFQ | serial production
Faurecia Battery Pack Solutions
Full Housing (with Function Integration) 整包的解决方案

COMPOSITE BENEFITS

- **Weight/volume reduction:**
  - Composite Weight: up to -15% vs aluminum 相比铝减重15%
  - Volume: up to -15% vs alu base reference 减少15%的空间
- **(On demand) Functions integration:**
  - Thermal plate integrated in housing 热管集成
  - Integrated Electro Magnetic Shielding 集成电磁屏蔽
- **Hybrid Housing:**
  - No stamping for metal parts (plates, extrusion) 无冲压金属零件
  - No composite extrusion or braiding 无复合材料编织
  - Corrosion resistant composite parts 耐腐蚀

TECHNICAL DESCRIPTION

1. Structural Composite (SMC) upper Housing 复合材料上盖
   - EMC Compliance, structural performance by ribs, adapt. thicknesses
2. Aluminum Plate 铝板
   - High conductivity to optimize heat transfer from/to cells
3. Composite plate (SMC) w. coolant path 复合材料集成热管理
   - High insulation to guarantee thermal bubble w. external environem.
4. Structural Composite (RTM) Skid Plate RTM 下盖保护
   - Underbody protection from road debris impacts

**APPLICATIONS**

- **Vehicle Application:** BEV and PHEV, fitting for high weight / volume efficiency 大批量的PHEV和BEV
- **Status:** proto testing in 09.2018 已完成样件测试和法规认证

**Note:** 2 & 3 Layers for thermal function integration only
350 / 700 bar high pressure composite hydrogen tank(s)

- Composite material reinforced with carbon fiber
- Lightweight Type IV tanks with best-in-class storage efficiency (7wt%)
- Very low H2 permeation
- Reduced cost thanks to carbon fiber use optimization

FUEL CELL TECHNOLOGY

燃料电池技术
## Composites Characteristics

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightweight</td>
<td>Significant weight reduction (20-50%) 减重20%-50%</td>
</tr>
<tr>
<td>Mechanical performance</td>
<td>Strength, Stiffness and Resistance to impact 优良的强度、刚度和抗冲击性</td>
</tr>
<tr>
<td>Functional integration</td>
<td>Reducing nb of parts / Design freedom / Deep drawing feasible 减少零件数量/设计自由度更高</td>
</tr>
<tr>
<td>Customized material</td>
<td>Large number of options to design the best material (cost/performance) 设计多种材料的最佳方案</td>
</tr>
<tr>
<td>Energy absorption</td>
<td>High energy efficiency (fabric + delamination, thermoplastic composite) 高的能量吸收效率</td>
</tr>
<tr>
<td>Corrosion-free</td>
<td>No e-coating required if without metal (if composite-metal = corrosion protection required by glass layer or glue) 不需电泳</td>
</tr>
<tr>
<td>Electromagnetic transparency</td>
<td>Transparency of the composite parts for waves transmission (WIFI) in connected cars 电信号传递无障碍</td>
</tr>
<tr>
<td>Electrical insulation</td>
<td>High space 空间利用率高</td>
</tr>
<tr>
<td>Thermal insulation</td>
<td>Integrated material insulation with glass fiber (ie for battery pack (vs. steel or alu) 隔热保温</td>
</tr>
<tr>
<td>700 bar pressure resistance</td>
<td>High pressure compliant with carbon fiber 存储高压</td>
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</tbody>
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