MaterialScience

Bayer R&D Investor Day 2005

December 8, 2005 | London

Bayer MaterialScience

Bayer R&D Investor Day 2005

Innovation in Automotive

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Forward Looking Statements

This presentation contains forward-looking statements based on current assumptions and forecasts made by Bayer Group management.

Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in our public reports filed with the Frankfurt Stock Exchange and with the U.S. Securities and Exchange Commission (including our Form 20-F). The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

Key Messages

- Steady growth in polymers for automotive applications
- Providing smart solutions with polyurethane-based innovations for
  - Composites for exterior parts
  - Coated polymer parts
  - Self-healing coatings
- Technology brake-through achieved in automotive glazing based on polycarbonate

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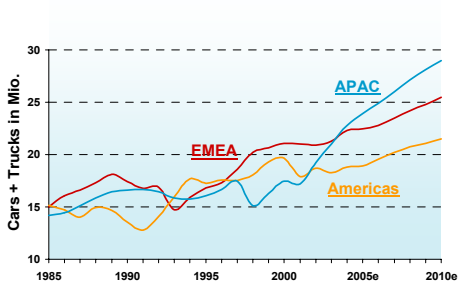
Attractive Growth Opportunity in Automotive

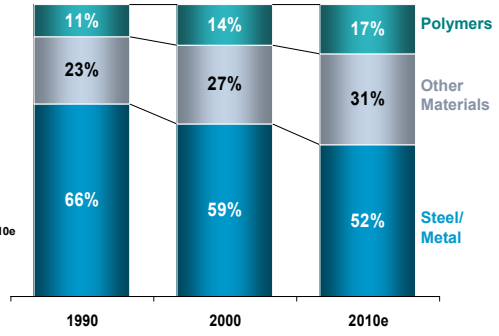
Driven by Market Growth and Material Substitution

Car & truck production



Development of the material shares

Based on average automotive weight of 1.3 tons



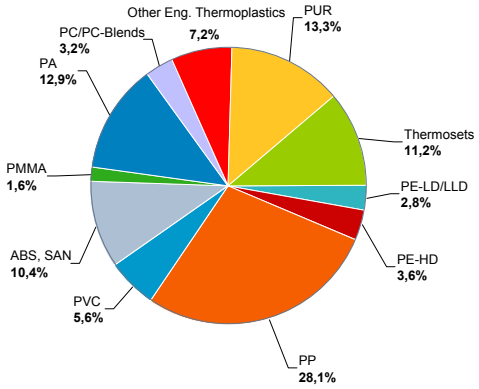
- Dynamic market for car and truck production: market growth +3% CAGR (1985-2010e)
- Polymers expected to grow over-proportionally by replacing metal and other materials

* forecast

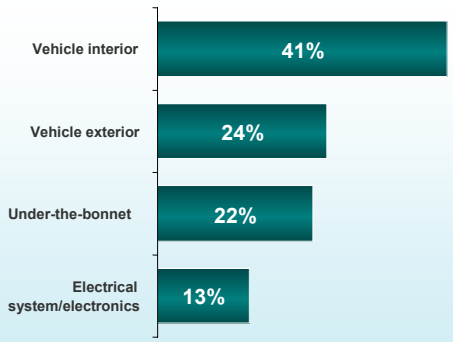
Various Polymers Used in Automotive

Bayer Strong in High Value Segments

Split by product Total 2004: 12,500 kt



Split by application areas



Growth of polymers in cars through substitution: CAGR 3% (1975-2005, share of total weight)

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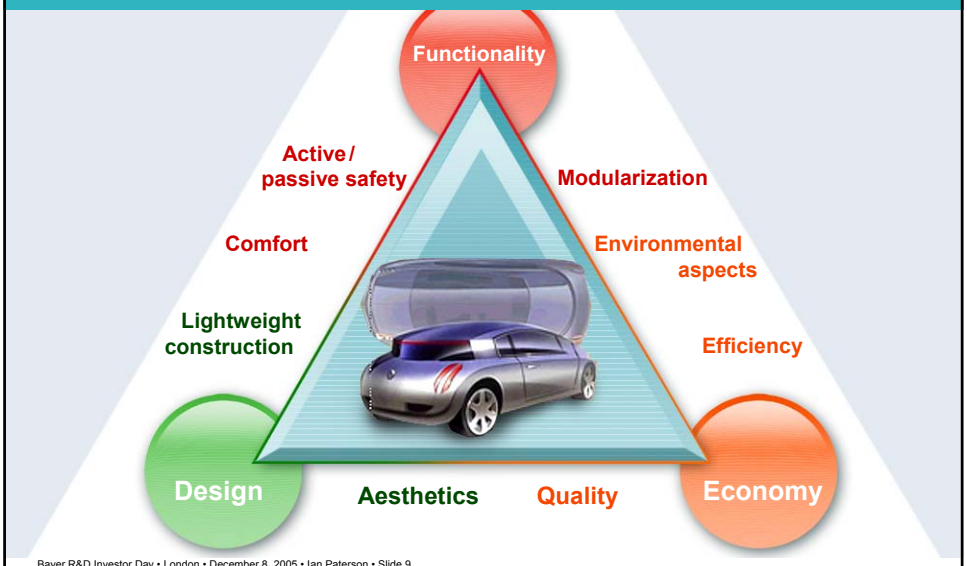
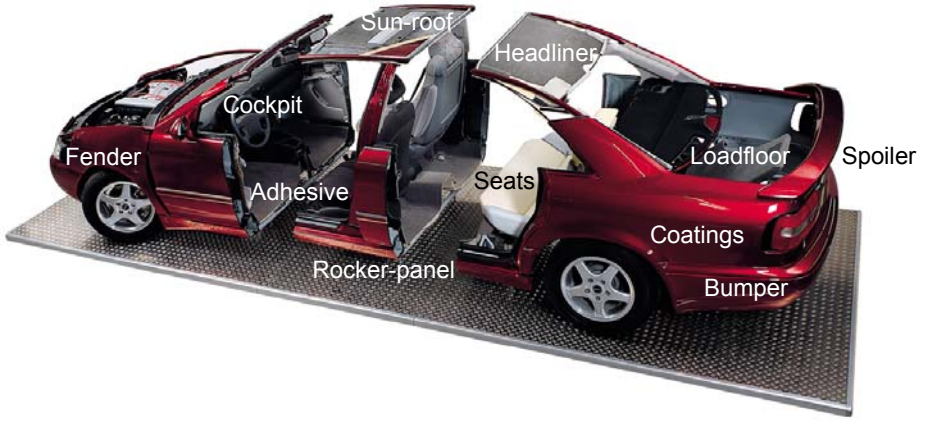
Innovation in Automotive
A Broad Spectrum of Requirements to Meet



Polyurethane Offers Multiple Solutions
Applications From Bumpers to Seats or Headliners



Polyurethane-based solutions are found in virtually every car today

Replacing Steel With Polyurethane
Horizontal Composites for Exterior Parts

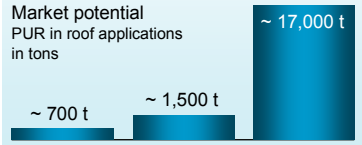
Specific requirements met by polyurethane

- Integrational properties, allowing modularization of entire roof part
- Steel-like dimensional stability
- Mechanical stability through glass fiber reinforcement
- Class-A surface quality

Present application and expected future potential

Hardtop Smart Forfour

Panorama roof Opel Zafira



Lower Costs Through Integrated Solutions
More Than Just Replacing Steel

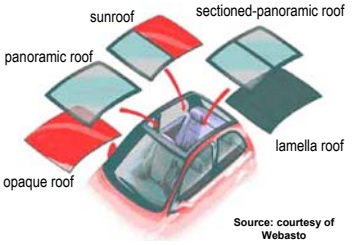
Advantages of PUR-based roof solutions and structural members

Material substitution:
Cost & weight savings

Integration & consolidation:
Savings on assembly costs

Safety:
Lower center of gravity
Improved crash behavior

Sunroof solutions:
Weight savings



Source: courtesy of Webasto

Modularization as competitive advantage – Coat, structural part and headliner in a single assembly

Reverse Coatings Process Raises Efficiency
Joining Coatings and PC Film Technologies

Technology today: Thermoplastic molding, then spray coating

- Multiple handling steps
- Expensive paint shops
- Overspray
- Long oven drying time (30 min.)
- Complex process, risk of paint defects

Reverse process: Coating of PC film, then component forming

- Less investment for paint shops and oven
- No overspray for 2D film coating
- Lean process with short drying time (2 min.) and fewer paint defects

Reverse Coating Process: Profile and Status
Offering Customized Solutions

Combination of PUR coatings and PC film offers high performance profile

Profile

- Formability and elasticity of coated PC film
- Tailor-made coating solutions for various applications:
- Automotive **exterior** parts, e.g. roof module:
  - High scratch and chemical resistance through UV post-curing of coated PC film
  - Class-A surface qualities
- Automotive **interior** applications:
  - Soft-feel haptics, e.g. velvet-like

Status

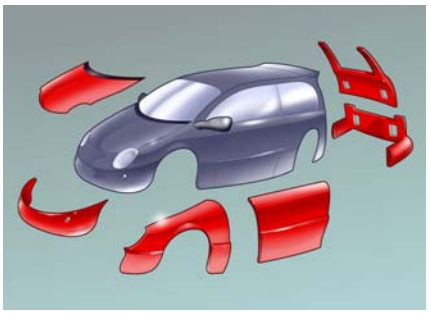
- Patents filed
- Roof modules in pilot production
- Expected market introduction of soft-feel PC film (velvet-like touch) in 2006

Thermoformable soft feel coated PC films for automotive interiors

Thermoformable coated PC films for automotive exteriors

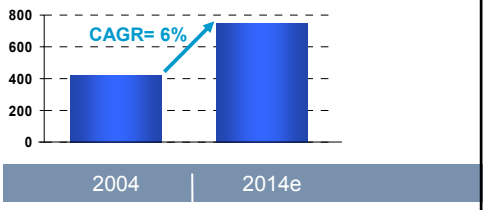
Coated Films Have Huge Potential

All Polymer Add-On Parts Potentially Accessible



All polymer add-on parts can potentially be manufactured via film based technologies

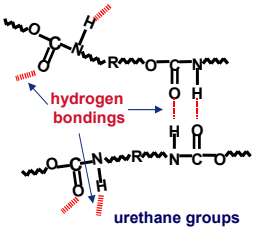
Polymer coating raw material market for automotive in € million



System approach using coated film technology to become new state-of-the art in automotive polymer coating

New Opportunities – Healing Coatings

2K-PUR Clear Coatings With Unique Properties



Requirements for automotive clear coatings

- High brilliance
- Excellent scratch resistance
- No etching under environmental stress

Polyurethane technology as solution provider

- Chemical and physical bonding (H-bonds)
- High stiffness but flexible
- Chemical resistant functional groups

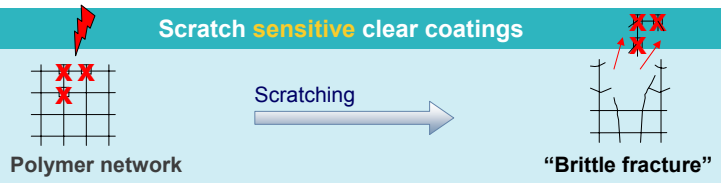
→ High scratch resistance
→ Self-healing properties

Long lasting gloss through specific aliphatic isocyanate and polyol combinations

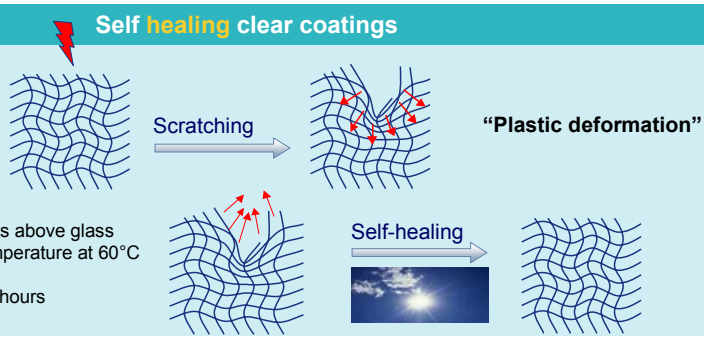
Innovation in Self-Healing Coatings

Plastic Deformation vs. Brittle Fracture

Scratch sensitive clear coatings



Self healing clear coatings



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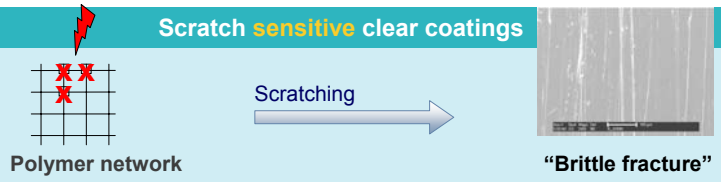
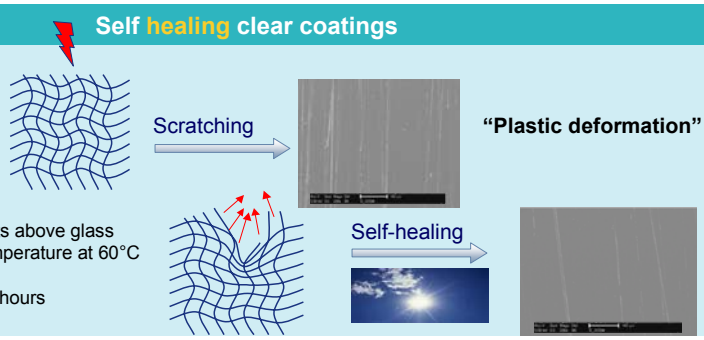
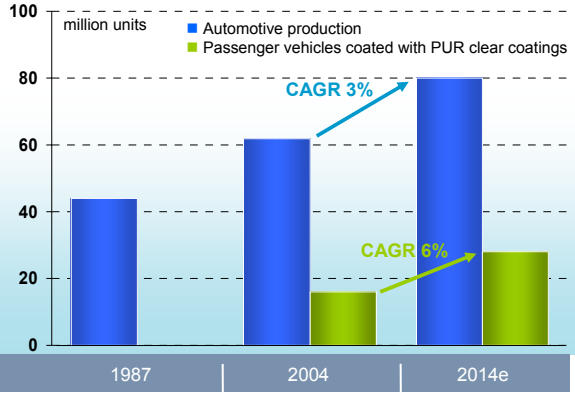


Self healing clear coatings



Market Potential of Self-Healing Coatings

PUR Clear Coatings Outpacing Market Growth



Market share PUR clear coatings

(of total coatings in auto)

1987	0%
2004	25%
2014e	35%

Matching Future Challenges in Automotive

Bayer Materials Likely To Be Polymer of Choice

Easy-to-clean coatings

- First waterborne graffiti resistant coatings raw materials
  (VOC compliant clear coats approved by Deutsche Bahn AG)
- Expected first industry application **2006**

LED head lamps

- PCS-based LED application in front lighting and backlight unit
- Maintenance-free, energy efficient, design freedom
- Expected first industry application **2008-2009**

Pedestrian protection systems

- First hybrid bonnet/hood concept, based on alu foam and a PUR system
- High energy absorption, high stiffness, low weight
- Expected first industry application **2012-2015**

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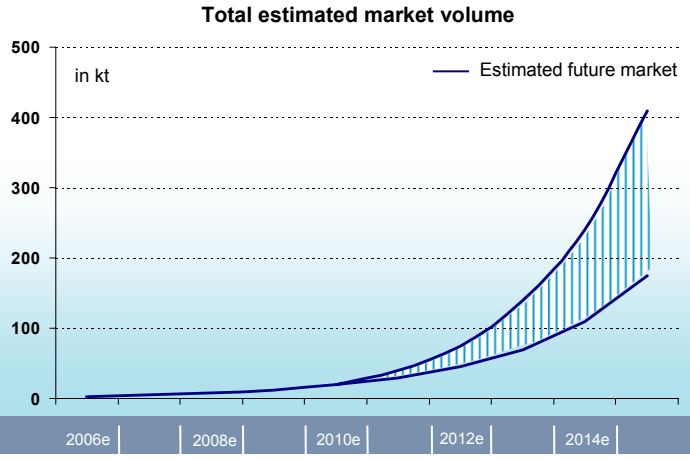
Not Revolution, But Evolution

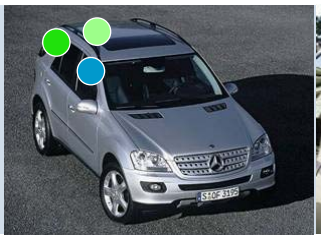
Polycarbonate Demand For Automotive Glazing

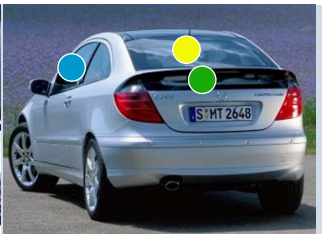


Business plan intact: Very attractive market with long-term growth potential

PC Automotive Glazing at the Beginning

Project Pipeline with Clear Milestones

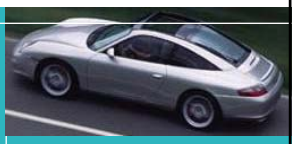




	Estimated start of production
Roof modules	Running business
Fixed side windows	
Transparent rear body parts	
Backlites	2008e
Rear truck sliders	2009e
Moveable side windows	2012e

Significant Advantages in Glazing

Polycarbonate Properties Match Industry Demand



Weight Saving & Environment

- Lightweight door designs
- Removable windows
- Lower center of gravity
- Fuel economy

Safety & Security

- Passenger retention
- Anti "smash-n-grab"

Styling and Design

- Design freedom
- Reduced assembly complexity and functional integration
- Tailor-made color matching

Polycarbonate is the only polymer to meet broad spectrum of requirements

Innovative Solution for Scratch Resistance

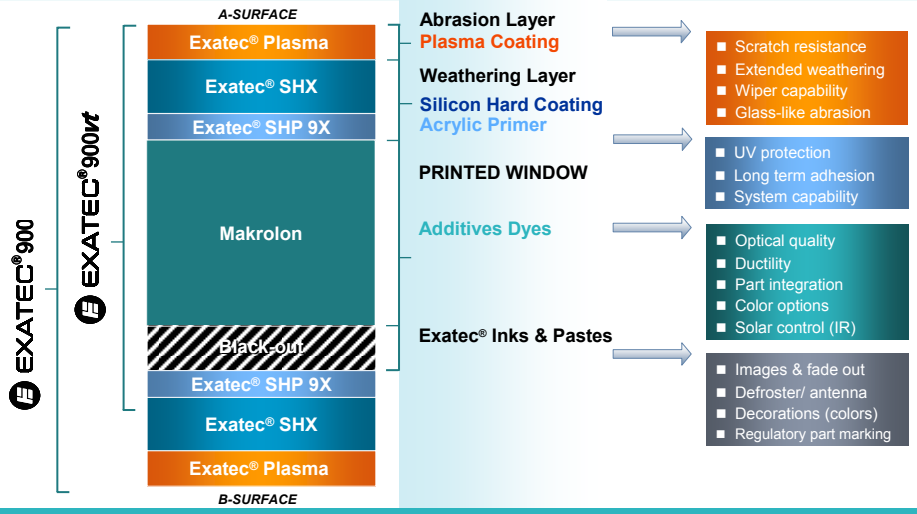
Bayer MaterialScience and Exatec® Deliver

- New plasma coating provides glass-like abrasion and scratch resistance
- Long-term weatherability
- Specific Makrolon polymer grades as substrate for nano-scaled layers
- Inclusion of functionalities: defroster, IR absorption
- Cost competitiveness and higher production output

EXATEC™

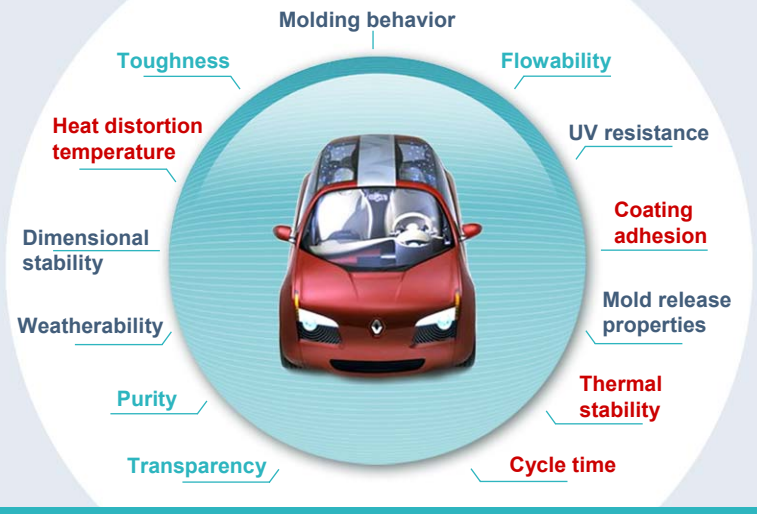
Technology Breakthrough With Exatec®

Highly Functional and Cost-Efficient



Polycarbonate glazing technology for window and vehicle top applications

Challenges Beyond Scratch Resistance
Complex Resin Requirements



Specific Makrolon grades for specific automotive glazing requirements

Innovation in the Automotive Industry

- Bayer is well positioned in the growing market for polymer applications in automotive
- Increased modularization and inclusion of additional functionalities go beyond mere substitution of established materials
- Polyurethanes offer cost-efficient, tailor-made solutions to specific needs of automotive industry
- Technological breakthrough in polycarbonate for automotive glazing
- Transportation sector (incl. trains and planes) potentially opens up new market opportunities in Far East

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