Trends in Polymers

Polymer Innovation Day
DPI Value Centre
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What is happening in polymers?

New applications!

New products!

Interpolymer competition!

Replacement of metals / glass!

New Technologies!

Other feedstock!

Biobased!

Shift of production sites!

A selection of trends is presented
## Trends

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1: Close the Value circle

- Feedstock: Fossil & biomass
- Polymer producer
- Distributor Compounder
- Converter
- Recycler
- User Consumer
- OEM
- Distributor Retail
- Design

Options:
- Chemical recycling
- Mechanical Recycling
- Energy Recovery
- Disposal
2: Fossil based: polymer production moves

To feedstock sources: Middle East / USA (recently – shale oil)
To production centers: Asia

Source: Nexant/ChemSystems; Booz & Company analysis
3: Biobased feedstock

Chances:
- Potential local availability,
- Sustainability: renewable feedstock’s (short-cycle CO2),
- New polymers / new applications
- Demand rather low because of price effects
Biobased ≠ Biodegradable ≠ Compostable

Consider the use and disposal of a product!
4: Mechanical recycling

Collection – sorting – separation and cleaning

- Target: use r-polymer to replace (partially) v-polymer,
- Volume is required for good economics,
- Other polymers are pollutants.
5: Chemical recycling

a) Depolymerization of polyesters and nylons,
b) Back to oil / nafta?
c) Back to base chemicals?
d) Back to syngas?

As mechanical recycling and depolymerization are limited to well sorted waste streams, solutions for waste streams of mixed plastics must also be researched.
6: Upgrading of commodity polymers

- Additives & modifiers
- Applications
  stronger, stiffer, low T-application
7: Functional polymers

- Extra functionalities added in polymers:
  - electrical conductivity
  - thermal conductivity
  - optical properties
  - magnetic characteristics

Opportunities for new applications
Magnetic rubbers

Compounding

Magnetic Mold implemented on Injection molding

Anisotropic TPE-based MRE
Smart textiles

- Textronics heart rate sensor
- Adidas/Polar HR shirt
- Textile key pad, SOFAR
- Smart bandage
- Holst
- Heated car seat
- LED signale
Super absorbing polymers

- Moisture absorbing capacity: up to 500x its own.
- Cooling capacity by vaporization of water.
Optical polymers

- Displays (OLED), lighting, solar applications
7: Composites

Thermosets, fiber reinforced
or
Thermoplastics, fiber reinforced

Advantage of thermoplastic composites: automatic processing, better for mass production

Applications:
Mainly as replacement of metals in structural applications, in:
- Constructions: bridges, buildings
- Transport: cars, airplanes
- ........
Thermosets in construction
MEGATREND Thermoplastic composites
Thermoplastic composites
More versatile in processing, lower costs.
9: Gas assisted moulding

- Reduced weight
- Reduced wall thickness
- Strengthen products
- Reduced cycletimes
10: 3D-printing: Trend or Hype?

• Fit to produce unique products:
  - Prototyping & small series
  - Production of small parts
  - Medical applications and implants
  - Funproducts
  - Customisation of mass produced parts
3D-printing for tooling
Missing trends?

This is what we have seen in our industrial contacts.

What did you miss?