Let's make it work! Plastics from renewable raw materials

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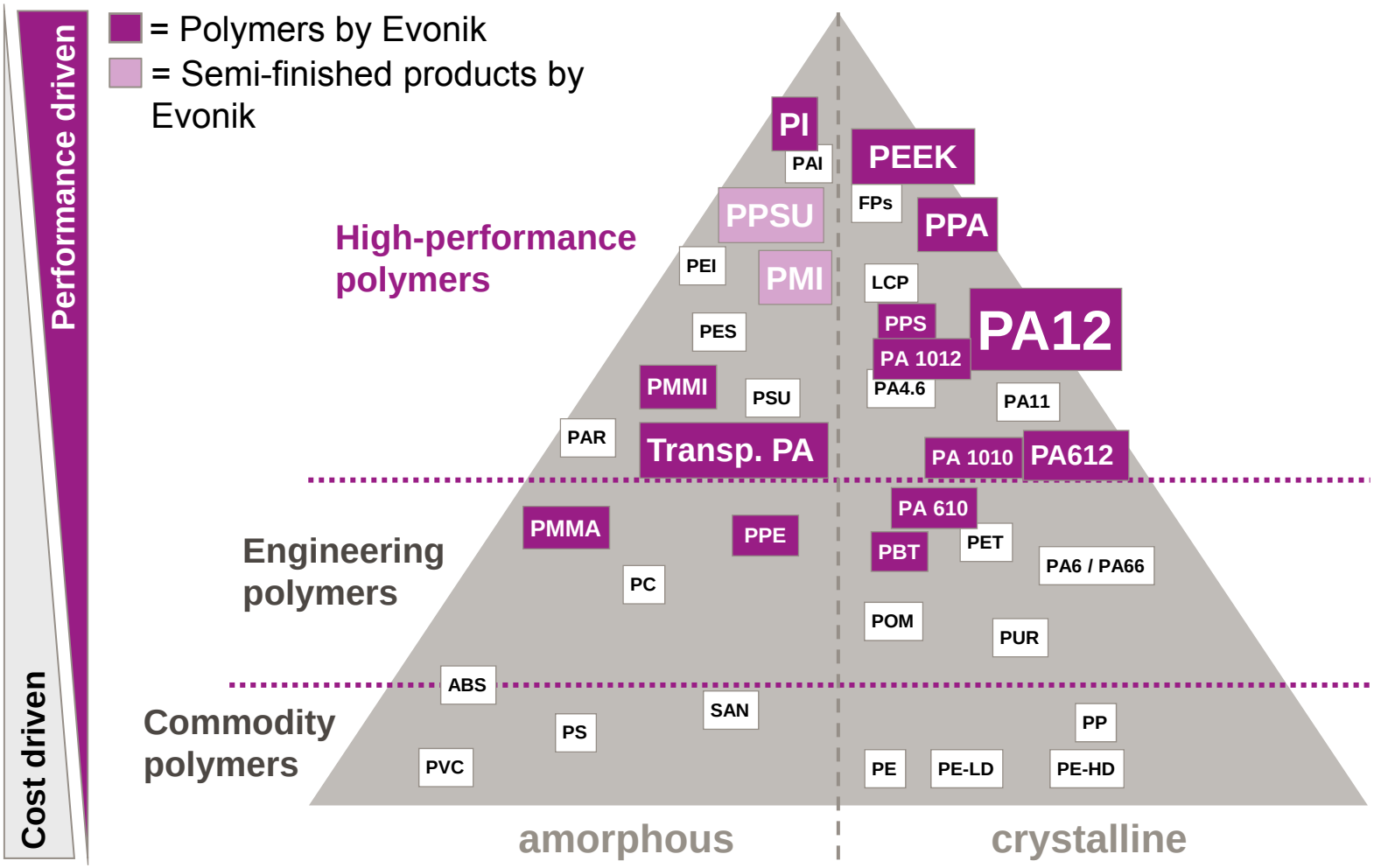
EVONIK INDUSTRIES

focus on high-performance polymers



Bio-based lauryl lactam as an alternative basis for polyamide 12

BioLL stands for ‘bio-based lauryl lactam“

Lauryl lactam is the basis for polyamide 12 – an important high-performance plastic that is used in many industries

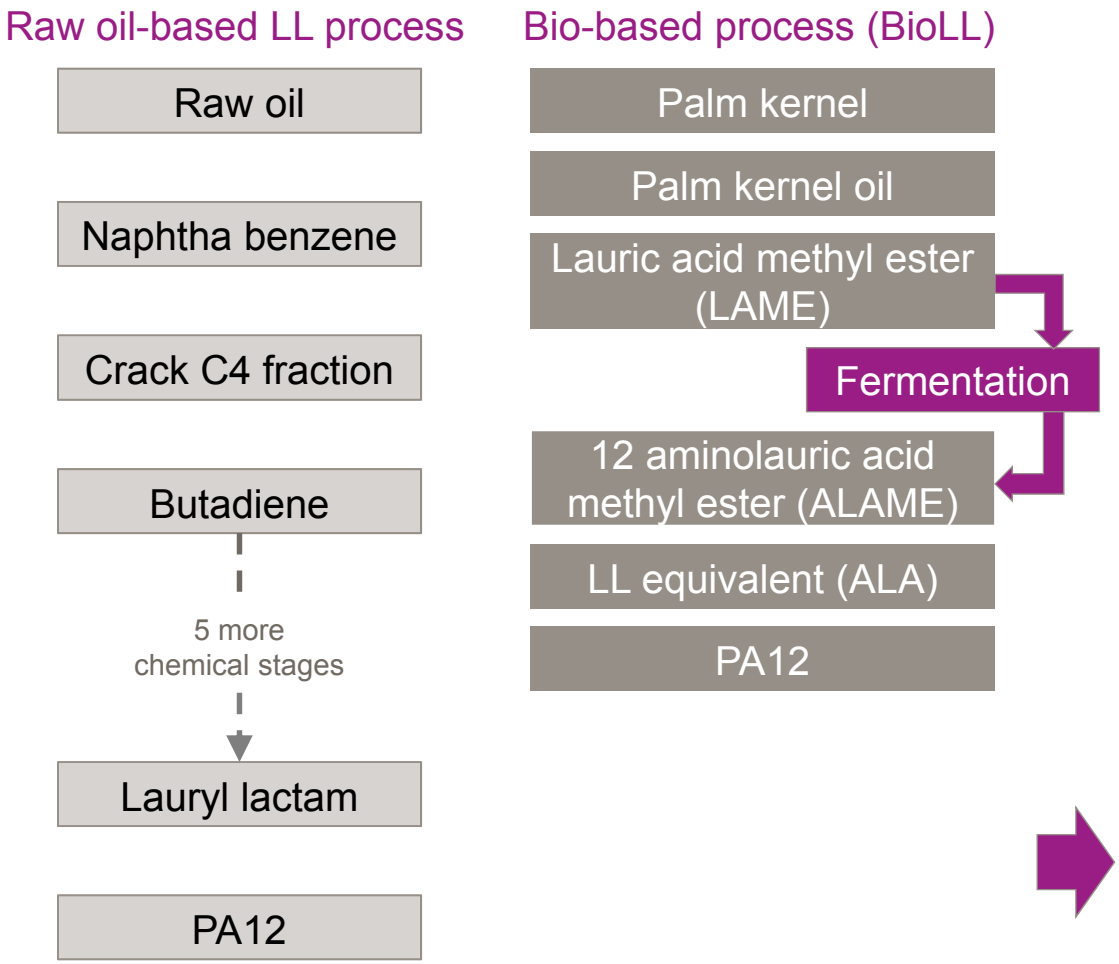
Soles of shoes for the sports industry

Brake pressure lines

Offshore pipelines

Powder coating for dishwasher racks

Economy and ecology are not contradictory terms



Fermentation processes are profitable if the number of chemical stages can thereby be reduced

New development of a biotech process poses challenges

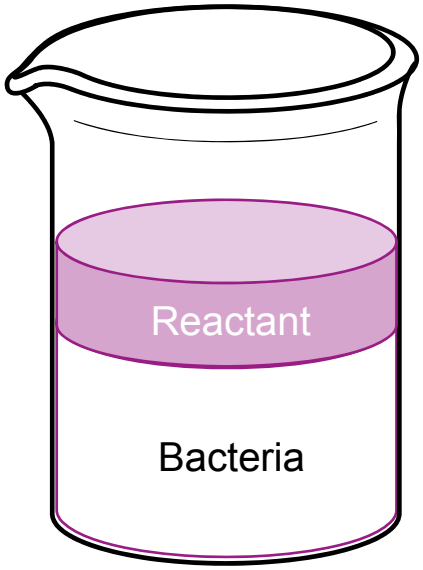
	Challenge
Strain development	Stable strain with high productivity, selectivity
Process development	Stable process with little need for capital, and low energy and steam consumption
Reprocessing	Highly purified product easily reprocessed for polymerization (Polymer Grade)

Problem:

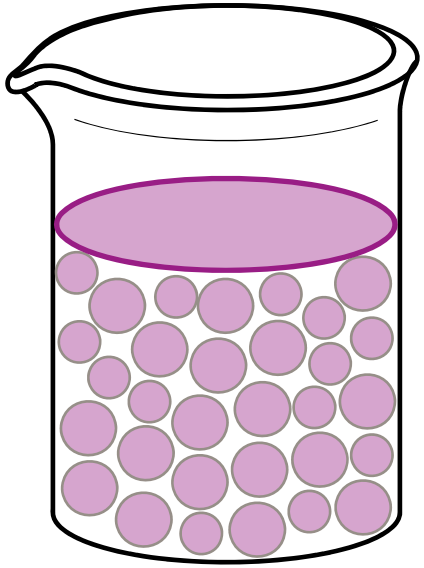
The product required was damaging to the cells. This is similar to alcohol fermentation where the alcohol becomes toxic to the yeast after a certain concentration.

The solution: 2 phase fermentation

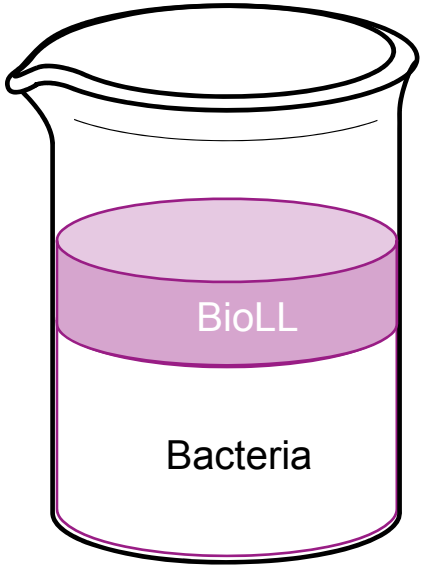
Before reaction



During reaction

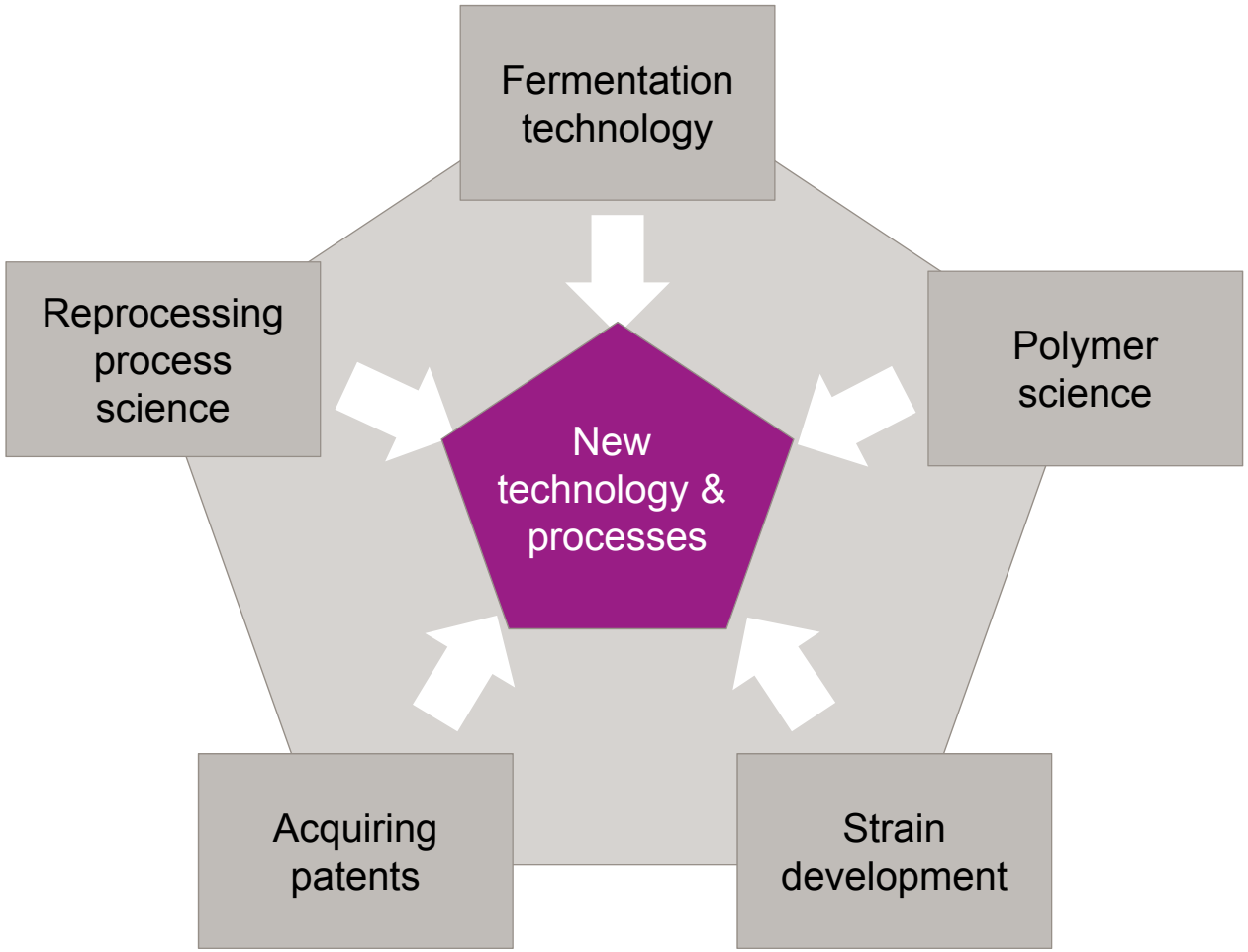


After reaction



The product is extracted during fermentation using another fluid.

Our asset:
combined technology skills



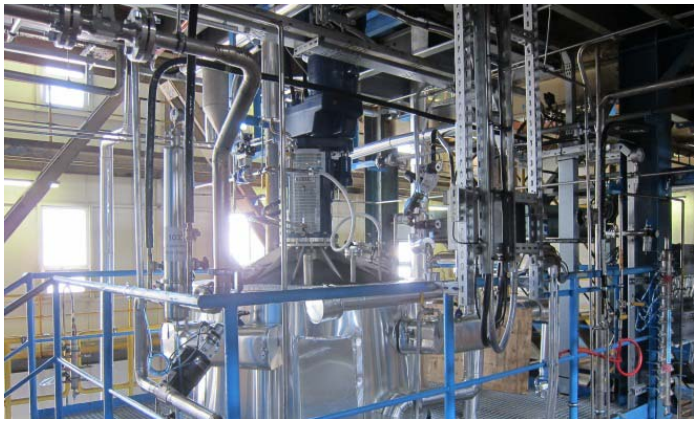
Since 2013: Pilot facility for manufacturing BioLL

Several million € were invested into constructing a pilot facility for manufacturing BioLL at the site in Slovenska Lupca.

- Specialized Evonik site for fermentation with good infrastructure
- Staff with a lot of motivation and skills in fermentation

The pilot facility's objectives are to wire up fermentation and downstream processes and to scale up the process.

Evonik site in Fermas, Slovakia



Fermentation reactor

Summary and prospect

- New fermentation technology was developed, product is extracted in situ.
- This was only possible through interdisciplinary cooperation.
- Evonik has registered approximately 20 patent families in the BioLL sector.
- The new process can supplement crude oil-based production of PA12 on a long-term basis.

The development of the fermentation process for the polyamide precursor stage ω-amino lauric acid (ALA) was subsidized by the Federal Ministry of Education and Research.

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