



The Miniplant of the Laboratory for Technical Biopolymers

Industry-oriented synthesis of polyesters and polyamides

Scaling up laboratory processes to industrial scale is a major challenge in product and process development. Before setting up industrial plants, it is necessary to know the optimum process conditions in terms of pressure, temperature, reaction time and catalyst quantity, for example. Pilot plants used for this purpose often operate on a scale of several hundred liters.

This requires correspondingly large quantities of reactants, which are usually not available during the development phase of new synthesis processes, especially if the reactants are obtained from biobased raw and residual materials.



Miniplant

Process development with small reactant quantities

The miniplant of the Laboratory for Technical Biopolymers (LTBP) solves the problem of limited raw material quantities during the development phase of new biobased polyesters and polyamides. With its setup consisting of two 1.5-liter stainless steel autoclaves, designed for pressures up to 200 bar and temperatures up to 350°C, a distillation section, PLC control and controlled gas dosing, it can replicate industrial polyaddition and polycondensation processes on a much smaller scale. At the same time, the reduced input quantities significantly lower development costs. Polymer amounts of 500 to 1000 grams per batch can be obtained depending on the process. With the testing and analysis methods available at the LTBP, it is thus possible to comprehensively determine chemical, mechanical and thermal characteristics of the products.

In addition to polyaddition and polycondensation reactions, hydrolytic polymerizations of lactams and lactones can also be carried out. Furthermore, radical polymerizations under inert gas (nitrogen or argon) and hydrogenations are possible.

Our services

- Development of biobased polymers
- Process development
- Process optimization
- Production of samples up to 1 kg
- Polymer analysis, material testing

Technical data

- 2-stage plant with two 1.5-liter autoclaves made of 1.4571 stainless steel
- Designed for pressures up to 200 bar
- Designed for temperatures up to 350°C
- Distillation section
- PLC control
- Controlled gas dosing (hydrogen, carbon dioxide, nitrogen)
- Autoclaves can optionally be used and controlled individually

Processes

- Polyaddition
- Polycondensation
- Hydrolytic polymerization
- Radical polymerization
- Hydrogenation

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