Fraunhofer UMSICHT

© Fraunhofer UMSICHT/Christian Bohnenkamp

Foamed bioplastics

We have the recipe for success!

Development of customized compounds for the manufacture of foamed products

Bio-based plastics are increasingly establishing themselves as a sustainable alternative in many areas of application. One still comparatively new area is foamed products. When developing the foamable compounds, we use the chemical, material science and process engineering know-how of our team of technical and scientific employees.

We create compounds by blending, additivation and reactive extrusion, using the wide range of commercially available bioplastics. When selecting materials, we take equal account of raw material availability, market opportunities, sustainability and cost effectiveness.

We adapt the material properties both to the processing procedure (e.g. extrusion foam, particle foam) and to the requirements with regard to the planned application. Testing of the relevant material characteristics rounds off our range of services.

Industries

- Plastics processing industry
- Automotive and supplier industry
- Packaging industry
- Construction industry
- Consumer and consumer goods industry
- Machinery and plant manufacturer

Technological specifications

Materials development from laboratory to industrial scale:

- Twin screw extruder from 10 kg/h to 400 kg/h
- Underwater pelletizer
- Determination of rheological properties e.g.
  - Rheotens
  - High pressure capillary viscometer
- Material characterization e.g.
  - SEM, Microscopy
  - Tensile/compression test
  - Heat resistance
  - Investigation of the biodegradability

Our service

We develop customized compounds based on bio-based plastics for conventional foaming processes and applications:

- Material development based on various bioplastics such as starch, polylactic acid or other biopolyesters, drop-in plastics and cellulose derivatives for e.g. extrusion foaming, particle foaming or foam injection molding
- Incorporation of chemical blowing agents
- Synthesis of functional additives for the optimization of rheological properties
- Increasing the bio-based proportion of C_{bio} in the compound
- Comprehensive analysis of the plastic melt and adjustment of rheological parameters
- Determination of the solubility of gases in polymers under different pressure and temperature conditions
- Testing of the resulting foam properties
  - mechanical, thermal and morphological

Your benefit

Cooperation with Fraunhofer UMSICHT means:

- Competitive edge through innovative materials
- Short development times from the idea to the finished product
- Application-oriented material development
- Scientific support for your research and development projects
- Rapid execution of tests and their evaluation
- Support for the implementation of the Sustainable Development Goals (SDG) in your company

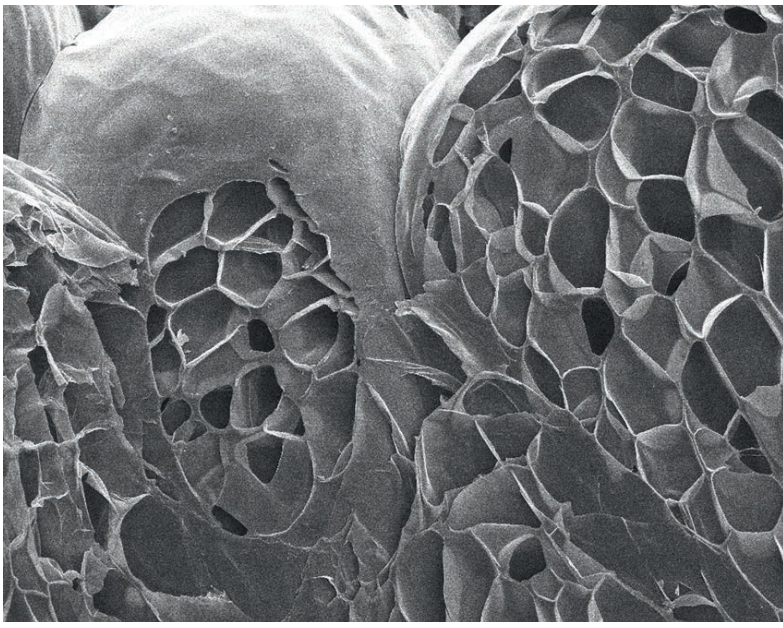
Project examples

Bio-based sandwich board
Development of an expandable granulate consisting of a cellulose ester/PBS blend. Application as a bio-based mid-layer foam for lightweight panels (EPS replacement).

Starch particle foam
Development of compact starch particles for further processing into expanded molded parts. Application in the field of transit packaging, e.g. as a substitute for EPP.

Extruded foam films
Development of various compounds for foam extrusion based on PLA, PBS and cellulose esters. Use e.g. for the production of food packaging (thermoforming).

Detail image of particle foam



Contact

Christina Eloo, M. Sc.
Group Manager
Plastics Development
Circular and
Bio-based Plastics
Phone +49 208 8598-1179

Fraunhofer Institute for
Environmental, Safety and
Energy Technology UMSICHT
Osterfelder Strasse 3
46047 Oberhausen, Germany
www.umsicht.fraunhofer.de

Tatiana Andreiko, M.Sc.
Circular and
Bio-based Plastics
Phone +49 208 8598-1356

circular-bioplastics@
umsicht.fraunhofer.de