

1 A transparent extruder:

Sensor systems in the processing areas allow for real-time process characterization.

2 Thermal image of an extruder.

QUICK AND EFFICIENT PROCESS MONITORING WITH OPTICAL MEASUREMENT TECHNOLOGY

Increasing demands placed on cutting-edge plastic materials and on even more complex automated manufacturing processes require new solutions and the continuous optimization of quality control methods. For this reason it is necessary to employ rapid and robust measuring methods which are suitable for industrial application and make it possible to simultaneously define a wide range of different parameters.

Spectroscopic measurement processes are quick, flexible and non-destructive. They provide a great amount of information and therefore have numerous advantages over conventional measurement methods. It is thus possible to monitor and control product quality and process stability in real time and to gain deeper knowledge and understanding in the field of process studies.

Both chemical properties, such as the structure of a plastic material, and physical properties, such as particle size and quantity, can be rapidly and simultaneously measured and analyzed. This enables the ICT to offer flexible and efficient processing technologies suitable for industrial application.

Fraunhofer Institute for Chemical Technology ICT

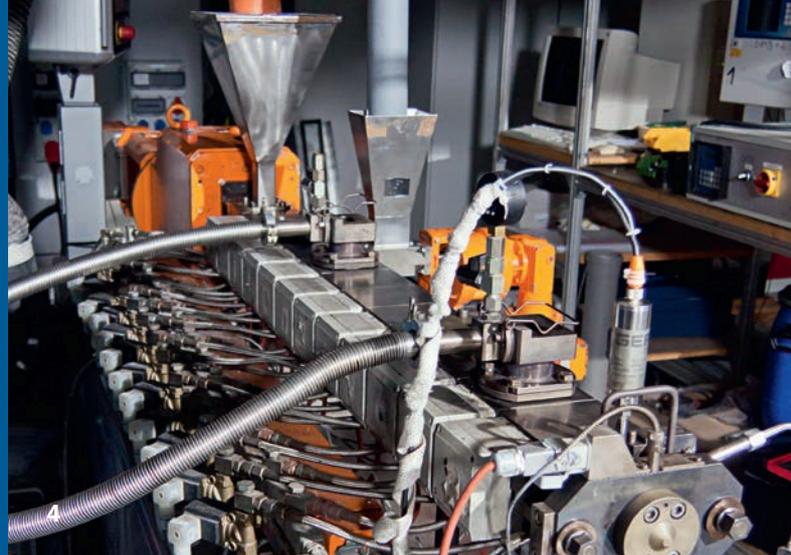
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Examples of practical applications

Monitoring for compounding and reaction processes

As spectroscopy is sensitive to a lot of chemical and physical parameters, it can be used as a tool for many applications in plastics processing. All kinds of questions relating to the composition of blends, moisture content, the identification of undesired decomposition processes through to real-time analytics of reactive extrusions can be answered with the help of a single measuring method.

Plastics detection in the area of recycling

Spectroscopy has already been used intensively in commercial plastic sorting lines. It has now proven to be an effective tool for the large-scale separation of waste plastics. As long as the basic technology is already installed, new challenges such as bans on certain substances (for example HBCD as a flame retardant) or the contamination of existing recycling streams (for example PLA bottles in PET streams) can be met by simply adapting the data analysis method without having to undertake additional investments.

Safe and effective control of the production cycle

Defective products lead to a reduction of quality, loss of time and thus higher costs. Optical measurement technology

in combination with other processing parameters, e.g. temperature, can help to ensure constant production cycles that meet quality requirements by monitoring processes and materials.

Our service offer

Benefit from our expertise and knowledge of processes

Our customers benefit from the know-how of the experts from all our departments. Our physics, chemists and material scientists work hand in hand with experienced technicians in order to find innovative solutions for specific problems.

Testing units and measurement technology

Various extruders with throughputs of 0.2 to 150 kg/h are available for development work, as well as numerous dosing technologies for solids, gases and liquids. In addition, the processing length of our extruders make it possible to conduct and analyze complex production processes. Various spectroscopic measuring systems and analytical methods enable individual investigations of processes and materials according to customer demands.

Advantages

Using real-time spectroscopy, efficiency can be increased for the whole value chain:

- Initial control of received materials using spectroscopy
- Process and/or formulation adjustment; comprehensive analytics for process tracking
- Characterization of received materials, correlating obtained spectroscopic data with material parameters and/or product properties
- Component production and testing, conventional and/or non-destructive

3 Twin-screw extruder with near-infrared spectrometer.

4 Leistritz ZSE 27 HP extruder with vacuum installation.