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## Process Analytical Technology (PAT) Monitoring of Particles in Flowing Polymer Melts

*M. Stephan, S. Große**Leibniz-Institute of Polymer Research Dresden, Hohe Str. 6, 01069 Dresden, Germany*

Process Analytical Technology (PAT) is a system for designing, analysing and controlling manufacturing through timely measurements (i.e. during processing) of critical quality and performance attributes of raw, in-process, intermediate and end products and processes with the goal of ensuring final product quality. PAT-tools are:

- modern process analysers or process analytical chemistry tools
- process and end point monitoring and control tools
- multivariant data acquisition and analysis tools
- continuous improvement and knowledge management tools

By application this PAT basic strategy on polymer melt processing during plastics generation and manufacturing about different lab-scale and industrial approaches already was reported. On this way PAT's for control of rheological, colour and dielectrical behaviour of polymer melts were developed.

A special area of a PAT in plastics industry is focused on monitoring of different types of particles/inhomogeneities in flowing polymer melts. To such particles/inhomogeneities belong uncomplete molten pellets, blend particles, liquid droplets from additives, agglomerated fillers, gels, black spots, bubbles etc. which may influence the required final materials quality very negatively.

In the first part of this presentation the state-of-the-art related to PAT-particle monitoring in polymer melts will be presented briefly.

In a second part about our unique **ProcessMicroPhotometer** sensors from **PMP** type for a timely/realtime monitoring of particles/inhomogeneities in flowing polymer melts will be reported in detail:

- PMP measuring principles and resulting particle informations
- technical features of different designed PMP sensors (transmission or reflection mode or both simultaneously)
- adaption of PMP's to different melt processing machines (SSE, TSE, IM).

The practical performances of PMP sensors by application on different polymer melts and particles/inhomogeneities types will be demonstrated finally.