Validation of In-Situ Particle Viewer

In-Situ Imaging technology for chemical / physical processes

Project	CS-01-04
Project leader:	Fred Hugen
E-mail:	Fred@perdix.nl
Partners:	Perdix Analytical Systems, Friesland Foods Domo, Albemarle Catalysts Company, TU Delft, NL GUTS
Budget:	50 K€
Duration:	Successfully completed

Incentive:

Important steps in chemical processes are the production of crystals, production of emulsions, or reactions with catalysts particles. The behaviour of particles/droplets in these steps are often not well understood. Therefore there is a need for real-time monitoring of the size, and shape of the particles/droplets.

Objective:

Perdix Analytical Systems (PAS) has developed submersible microscopes for in-situ imaging of particles. The imaging software is capable of measuring the size and shape of the particles in the images. The goal of the project is to validate the applicability of these probes for monitoring crystallization processes.

Approach:

Tests have been defined in order to validate the operating conditions and accuracy of the measurements of the ISPV.

The defined tests are:

- Laboratory tests on the size distribution of Lactose crystals in ethanol and in H_2O
- Monitoring the size distribution of Lactose particles in H_2O in real batch crystallization in a production plant

Results:

The results of laboratory testing of lactose crystals show that the accuracy of the measured D05 of the PSD is accurate within 10 micron and reproducible within 3 micron. Even the influence of abbreviation of crystals due to stirring is visible.

The crystallization process could easily monitor the PSD of the particles during the growth up to 5% mass. Also it was clear from the images that agglomeration already takes place in an early stage of the process.