CENTRE FOR PROCESS ANALYTICS AND CONTROL TECHNOLOGIES

CPACT NEWSLETTER **April 2014**

6-9 May 2014
Barcelona, Spain

The preliminary programme and registration details are now available at:
www.euro-pact.org

EUROPACT 2014 is the third European Conference on Process Analytics and Control Technology. The conference will cover new technologies in process analytics, the implementation of these technologies in various fields and the transformation of data into knowledge. The conference will be supported by an exhibition of instrumentation, applications and data evaluation tools.

EUROPACT 2014 provides a meeting and a discussion forum for scientists and users of process analytics from academia and industry. The conference programme will include plenary lectures and discussion during poster sessions. One day of Pre-Conference Courses (May 6) will provide a good introduction to the field for newcomers and advance the knowledge of existing practitioners.

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FEASIBILITY STUDIES ARE PROVING A HIT WITH MEMBERS!

GENZYME — One of the benefits of CPACT membership is that through feasibility studies, we have access to techniques and methods that are not available to us in-house, and are therefore able to evaluate novel methods of sample analysis to see if they are likely to work before we buy our own equipment.

Last year, as part of our efforts to further develop monitoring of a chromatography column used to purify a protein produced by fermentation, we supplied Strathclyde University with a number of samples collected during a chromatography run to see if fluorescence or Raman SERS monitoring would allow the different fractions to be distinguished based on their spectra.

This was always going to be a challenge, as the impurities present are structurally very similar to the main component, and the samples from the chromatography column were quite dilute. And so it proved to be – although weak fluorescence spectra were obtained, they couldn't be correlated with what we already knew about the samples from other laboratory measurements. Likewise, the Raman assessment indicated that the technique wasn't appropriate for this particular application.

So although the results were in one sense negative, the feasibility study served its purpose of allowing us to evaluate the methods, and we now know that we can eliminate these from future development studies and focus our efforts on alternative approaches.

Bob Samuel

genzyme
A SANOFI COMPANY

GE HEALTHCARE — GE Healthcare, Lindesnes site in Norway (a producer for contrast medical diagnostics), was looking for a convenient, robust and not too expensive technique to monitor the contrast media in our effluents. The challenge using UV/VIS spectrometry is that the contrast media absorb very strongly in the UV-region and too weakly in the VIS region. In the UV-region an OPL at 1 mm gives absorption > 5 CU in the concentration area we want to measure. In the visible area (VIS) the absorption is much weaker. If we use VIS and expand the OPL to 160 mm the detection is acceptable, but then we get a lot of false alarms due to discolored/dirty water in the effluent.

CPACT carried out a feasibility study where the aim was to suggest a suitable technique for in-line monitoring of contrast media in the effluent.

We sent over some samples of our contrast media to CPACT, and a student tested several varieties within UV/VIS spectrometry. We had some conference calls during the process to clarify details and issues, and had good discussions.

The student at CPACT tested several techniques we don't have the opportunity to test ourselves. Tests were performed with different instruments and probes (UV-ATR, Hellma transmission probe and MIR-ATR).

Finally we received an adequate report with recommendations and conclusions, and we had a conference call again to discuss the results. The report clarified what technique is possible or not for our application. The conclusions and recommendation given in the report are very useful information for us in general, and has played a crucial role in determining instrumentation for the effluent control. The report will surely be a good basis for future decisions as well.

Inger D. Saanum
GE Healthcare

FEASIBILITY STUDIES ARE PROVING A HIT WITH MEMBERS!

ASTRAZENECA

What AZ wanted to understand?
Can multiloop ATR MIR probes provide better or equivalent sensitivity to a UV/Vis transmission/ transflectance probe for monitoring dissolution profiles?

Partnership
Astrazeneca, Art Photonics and University of Strathclyde through the CPACT feasibility scheme.

Details of work
Dissolution studies of over the counter (OTC) tablets were used to understand the sensitivity and feasibility of using muiltiloop ATR MIR probes for the detection of soluble excipient material in the dissolution media. The aim of the work was to understand the limit of sensitivity and robustness of the probes.

Main conclusions
As expected, increasing the number of loops increased the pathlength and sensitivity when compared to standard ATR crystal type probes. Although sensitivity was increased, it was difficult to achieve the levels required to monitor soluble excipients in a dissolution experiment. In addition, as the disposable loop exposes the silver halide fibre, the robustness of these probes is reduced compared with standard ATR crystal type probes. Hence, these probes are often sold as disposable loop probes. However, during this study it was observed that components of the OTC tablets induced degradation of the silver halide fibre impacting on the ability to monitor the full dissolution. Although, these probes have not shown to have the sensitivity and robustness required for the application investigated, it is evident that the increased sensitivity and disposable nature of the tips could have advantages for some applications.

Aspirations for the future
Investigate other probes with the potential of increased sensitivity to allow soluble excipients to be monitored during dissolution studies. Another type of MIR probe has been suggested by Art Photonics that may achieve the sensitivity required and has increased robustness compared to the multiple loop probes. On delivery of this probe further investigations will continue. Any other ideas to this challenge are most welcome.

Allyson McIntyre, AstraZeneca

OPTICO PROJECT for intensified plant design and operation

ARKEMA

BASF

CERTH

ChromaCon

DSM

DTU

ETH Zurich

Fibre Photonics

Imperial College

RWTH Aachen

TUDelft

Uni. Ghent

Uni. StrathClyde

Several CPACT members were instrumental in the formation of a European consortium which won EU FP7 funding for the OPTICO project. This project, which brings together thirteen partner universities and companies, aims at establishing a new adaptive and integrated computational framework, advanced process analytics tools, and advanced optimization/control techniques for intensified chemical/ biochemical plant design and operation. The work will promote a substantial improvement in plant efficiency by reducing energy consumption, operating costs, handled volumes and generated wastes, as well as by improving the process efficiency and safety.

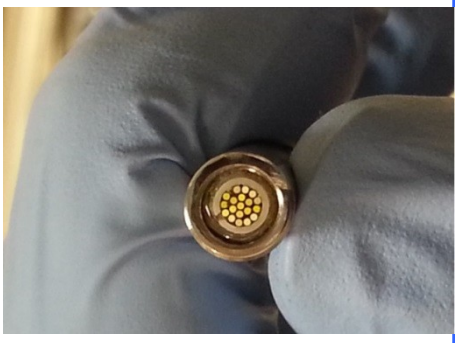
The integrated framework is being applied to four industrial processes:

- a pharmaceutical crystallization process
- a polymerization (i.e. suspension) process
- an organic oxidation with hydrogen peroxide process
- a monoclonal antibodyproduction/purification system

A comprehensive understanding of the various physical/ chemical/ biological phenomena (i.e. reaction kinetics, transport phenomena, thermodynamics, particle/crystal/cell size distribution and particle structure) occurring at different time and length scales is required.

The OPTICO project aims at the advancement of key enabling technologies and their applications:

- Implementation of in-line and on-line sensors for real-time monitoring of product quality.
- Compact fibre-optic multi-sensor systems providing information on particle size, chemical composition, etc.
- Robust sensors and development of in-line calibration and drift correction procedures
- Anti-fouling



You can read more about the OPTICO project at http://www.opticoproject.eu/ If you are interested in a multi-sensor probe for your own application then do please contact the OPTICO consortium partner and CPACT member, Fibre Photonics Ltd , as follows:

Trevor Whittley, Director of Product Development, Fibre Photonics Ltd, 3 Eliburn Office Park, Livingston, Scotland EH54 6GR

DATES FOR YOUR DIARY

FORTHCOMING WEBINARS

Design of experiments webinar series

15/22/29 May & 5 June 2014

Tomography webinar
Date to be confirmed

Photoacoustics webinar
Date to be confirmed

MANAGEMENT MEETINGS

CPACT Steering Committee

10 & 11 June 2014,
Ross Priory, Loch Lomond

PLANNED COURSES

Process Spectroscopy

9-11 September 2014
Clairet Scientific, Northampton

Introducing the newest member of the CPACT Team!

CPACT welcomes Christine Stevenson. Christine started her part-time post with CPACT at the start of December 2013. Christine will be assisting Natalie Kerr in the CPACT Office at Strathclyde University. Christine said that she is looking forward to meeting everyone and working closely with all of our members. Part of Christine ' s responsibilities will be to update the CPACT website and also the CPACT twitter, Facebook and Linkedin accounts, so if you have not already joined us on the social media sites, please get in touch. Christine ' s email address is:

christine.stevenson@strath.ac.uk

CPACT NEWSLETTER

Do you have an article to contribute to the CPACT newsletter?

If so, we would love to hear from you. Please email your articles to:

natalie.kerr@strath.ac.uk