HPLC 2009 – 34th International Symposium on High-Performance Liquid Phase Separations and Related Techniques.

International Congress Centre, Dresden, Germany. June 28th – July 2nd 2009

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HPLC 2009 was held in the historic Saxony city of Dresden. The baroque city centre is undergoing a renaissance with its many restored historic buildings presenting a most impressive skyline. The old town features some fantastic 18th and 19th Century architecture, including the palace and the Zwinger (an elaborate orangery) commissioned under the opulent rule of King August III. The conference centre is of modern Western design and is situated on the banks of the river Elbe, overlooking the city.

Fig 1. Dresden skyline from Congress Centre Terrace. *©(kBics Photographers)*

Fig 2. Prof Huber opens the meeting in the time honoured tradition. *©(PHOTO:GRYSA)*

The entire proceedings ran very smoothly and certainly the event was a credit to Prof Christian Huber,(fig 2) the Gesellschaft Deutsche Chemiker and the team of organisers, helpers and various committees who made the whole week run very smoothly leading to one of the best HPLC series of meetings that I have attended in over 25 years.

In total, there were ~1400 attendees. 8 plenary lectures, 90 lectures (across 3 parallel sessions), 9 tutorials, 16 vendor seminars, 630 posters and a vendor exhibition spread across the 5 days. As you can appreciate that is a lot to fit in a short report. As such, a link to the conference website (with full programme and full abstracts) is provided www.hplc2009.com and it is recommended that this facility be used for more detail on the event. Comments on the conference highlights are included in the remainder of the report to give a flavour of the content.

Sunday evening saw the official opening of the meeting with a musical background (Fig 3) with various awards being presented to well deserved recipients.

From the Chromatographic Society the Jubilee Medal was presented by Dr Denise Wallworth the Societies Hon. Secretary to Prof Gert Desmet from the Vrije University of Brussels, Belgium. (fig 4). The recipient of the Martin Medal, Prof Wolfgang Lindner from the University of Vienna was indisposed and unable to be present. For a more detailed background on both recipients see the June 2009 issue of Chromatography Today (www.chromatographytoday.com).

Fig 3. Musical opening. *©(PHOTO:GRYSA)*

Fig 4. A very happy recipient of the Jubilee medal. Gert Desmet (right) receives the award from Denise Wallworth. *©(PHOTO:GRYSA)*

The meeting also coincided with the anniversary of the commercialisation of one of the UK's most interesting and unique contributions to the field of separation science, Hypercarb TM, the porous graphitic carbon developed by Prof John Knox at the Wolfson LC Unit at University of Edinburgh 20 years ago. Rather more of a 'niche product' these days as opposed to the 'universal column' tag it first promised, it nevertheless is still capable of solving extreme problems. A workshop was held in the afternoon of the opening day with International speakers from industry and academia, speaking about their experiences and successes with the column including,

- Polar retention properties (Prof. M-C Hennion, ESPCI, France)
- PGC in SFC (Prof. C West, Unversite d'Orleans, France)
- High temperature separations (Prof. R Smith, Loughborough University, UK)
- A comparison between HILIC and Hypercarb for polar retention (Dr. E Sanchez, Evotec, UK)

Thermo Fisher who now manufactures the product line then sponsored a reception in the evening for all attendees to celebrate the event and of course no party is complete without a cake and this was no exception (fig 5).

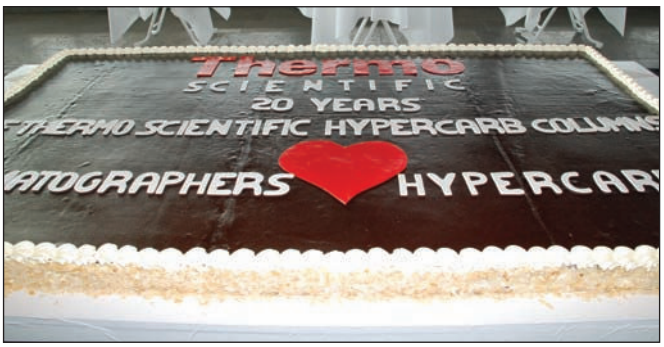

Fig 5. Happy Birthday Hypercarb *©(PHOTO:GRYSA)*

To finish the evening a spectacular firework display which lit up the sky above Dresden was held.

Fig 6. The meeting kicks off in spectacular style. *©(kBics Photographers)*

Lectures of particular interest to the Pharmaceutical Industry;

It is widely accepted that the major market segment to which HPLC, and associated techniques, are most applicable, is the Pharmaceutical Industry. Not wishing to play down the role scientists who are active in other areas such as Academia, Environmental, Chemicals, Food and Beverage and Life Science areas, space permits here only a review of the talks of most important to the Pharma industry. Of course many of the discoveries in this area do benefit those working in other market segments.

The key topics of lectures attended included HPLC fundamentals, Multi dimensional LC, Column coupling, Column technology, Pharmaceutical analysis, QbD and SFC. Much of the content was based around UHPLC and more efficient particles. It was soon apparent that Van Deemter plots were yesterdays news and that kinetic or Poppe plots were in vogue as they help describe and explain the effects of pressure and temperature on sub 2um separations and allow effective comparison with other particle sizes, column formats, different operating modes (e.g. High temp, UHPLC) and even other techniques.

A talk by Xiaoli Wang (AstraZeneca, Wilmington, USA) gave the best account of this when comparing sub 2um columns with superficially porous Halo-type columns. With increased time, Halo columns can generate more plates whilst at shorter analysis times similar performance is possible, but requires increased linear velocity on a Halo. Highlighted was the fact that if you could use a superficially porous phase at 600-1200 bar this would bring further improvements.

Gert Desmet is also big in the area of kinetic plots and also gave a fascinating talk. His recent publications are well worth a read and his website enables you to produce your own kinetic plots.

Roger Smith of Loughborough University gave a lecture on high temperature gradient separations. This has been an area of interest to Prof. Smith for some years. The green nature of this application is of note as increased temp can eliminate the necessity of organic solvent as high temp alters the polarity of water.

A talk by Chromatography legend Georges Guiochon was a must see. He lectured on all aspects of multi-dimensional LC, this was very much an 'idiots' guide, describing various types of 2D LC (on-line, stop and go and off-line) and their relative advantages and how they can maximise peak capacity. This is handy for especially complex mixtures. A key point was the Nobuo factor, whereby the fraction density (cut) should be optimized. Off line 2D LC can give a peak capacity of ~16000 in 24 hours.

Pat Sandra gave his customary plenary lecture. As usual this was an eye opener and looked at state of the art fluid separations. Be this UHPLC, SFC or EFC (enhanced fluidity chromatography, uses SFC conditions but not in the supercritical state). All techniques allowed high throughput and productivity and most importantly robust separations. The future should look at continuing our education in HPLC fundamentals, embracing QbD and also looking at green chemistry. EFC allows the latter with separations using water, acetone or ethanol, carbon dioxide and a pH modifier. Reverse HILIC (or per aqueous LC – PALC) should

also be considered. This utilises the XBridge HILIC column in 100% aqueous (potentially with EtOH gradient and CO2 to make it EFC).

SFC was in more prominence too. Eric Lesellier's group have been studying the fundamentals of SFC including measuring the apparent pH in the mobile phase (CO2:MeOH, pHapp <5) and chiral recognition mechanisms with a variety of CSPs. Whilst Claudio Brunelli (Pfizer, UK) gave an excellent talk on QbD in achiral pSFC method development. This covered the screening of stationary phases, mobile phases, acid/base additives.

Exhibition;

One of the high profile events during the exhibition was the launch of the new Agilent 1290 Infinity UHPLC system. Such is the interest in UHPLC these days ~10 vendors of suitable instrumentation, plus others offering consumables specific to this market segment exhibited.

Many vendors were showcasing new columns – in particular sub 2um and HILIC phases. It was noticeable that a lot of vendors were keen on transferability of methods from UHPLC to HPLC and as such having consistency across particle size (a poster by Mallard, Clarke, Petersson and Nightingale describes this benefit very well).

Other interesting hardware included Dionex's universal finger tight Viper fittings (up to 1000bar), VWR's EcoPure columns interestingly use a porous film instead of a frit, and the Aurora A5 SFC fusion – a module compatible with an Agilent 1100 (or later) that allows SFC on conventional LC systems.

The vendor seminars reflected the above. There was also representation from Bischoff Chromatography with their POP-LC, this is fascinating tool if a bit odd…almost LC for the LEGO generation! They now have moved in to gradient applications, which may mean that it is more applicable to Pharma R&D.

Additionally the release of a new Agilent CE did not go unnoticed, and there has been a small resurgence in CE owing to its improved sensitivity vs. older instruments, "green" nature and advantages for larger molecules. Part of the increased use has been down to improving the ease of use with several "platforms" and kits/applications solutions from Agilent and Beckman.

Space limitations prevent a more exhaustive review of exhibited products but a visit to many of the vendors' web sites from the organiser's web site, www.hplc2009.org will yield more information. It would also be remiss not to mention the fact that Issue 6 of Chromatography Today (editorial theme Bioanalysis) distributed at the meeting, was well received by people unfamiliar with the magazine resulting in many more readers requesting future copies.

Posters;

There were lots of posters, all on the key topics. It is recommend that browsing the abstracts is the best way to find posters of specific interest or author. Several posters were dedicated to tips, tricks and issues relating to UHPLC

Unsurprisingly there were many posters from vendors (Waters, Varian, Grace being most notable), these should be available to look at on their respective websites.

List of poster winners

Agilent Technologies Sponsored "Best Poster Award"

1st prize to S. Khirevich, University of Marburg/Germany: "Quantitative Three-Dimensional Structure-Transport Analysis in Chromatographic Beds of Arbitrary Cross-Section"

2nd prize to I. Francois, Exxon Mobile, Mechelen/Belgium: "Comprehensive and Off-Line Supercritical Fluid Chromatography - Reversed Phase Liquid Chromatography for the Analysis of Complex Triglyceride Profiles"

3rd prize to M. Haugg, University of Ulm/Germany: "Star-like Poly (alkyleneoxide) Coated Open Tubular Columns for Tuning the Separation Mode in Liquid Chromatography"

with honorary mentions in the Best Poster Award Competition to:

K. Broeckhoven, Free University of Brussels/Belgium: "Variability of Column Temperature During Gradient Separations in Current and Future Very High Pressure Liquid Chromatography Systems"

and

F. Vilaplana, University of Amsterdam/The Netherlands: "Towards New Polymeric Supports for Amylose Starch Separations"

Pfizer Sponsored Best Poster Award for "Innovation in Pharmaceutical Analysis"

1st prize to R. Nicoli, University of Geneva/Switzerland: "Development of an In-Capillary Method to Nanoscale Automated In Vitro Cytochromes P450 Assays"

2nd prize to P. Kacer, Institute of Chemical Technology, Prague/Czech Republic: "Immunomagnetic Molecular Probe for Monitoring of Biomarkers Present in Exhaled Breath Condensate"

four third prizes to:

B. He, Bristol-Myers Squibb, New Brunswick/USA: "Chiral Separation of Pharmaceutical Compounds with Multiple Chiral Centers by Liquid Chromatography: Method Development Strategy and Application of Pre-Column-Derivatization"

D. El Zeihery, University of Wuppertal/Germany: "Highly Variable Epigenomes in Healthy Adult Clones"

L. Steinhauser, University of Tübingen/Germany: "Identification of Flavonoids in Leaves of Graptophyllum pictum by High Performance Liquid Chromatography/Electrospray Ionization Mass Spectrometry"

S. Lackner, University of Innsbruck/Austria: "Detection of Hypoxia in Cultured Mammalian Cells in Vitro by HPLC-ECD"

And finally…….

Fig 7. Social Networking Dresden Style at the HPLC 2009 Symposium Dinner and Party at Ballhaus Watzke. From Left to Right- Gräfin Kosel" (engl. Countess Kosel), the mistress of Saxony's King August The Strong Professors Barry Karger, Christian Huber and. Karl-Siegfried Boos, and: "August der Starke" (engl. August the Strong), King of Poland and King of Saxony *©(kBics Photographers)*

Dates of next meetings

The onerous tasks to 'follow that' falls upon the Organising committee for the 2010 event – Dr Steven Cohen will chair, and that will be held in Boston, MA USA between June 19-24th (www.hplc2010.org). The meeting then returns to Europe and will be held in Budapest, Hungary (June 19-24th, 2011) and chaired by Professor Attila Felinger. More details can be found at www.hplc2011.org .