International Committee for Ion Exchange

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Contents:
I expect that most of you have already learnt of the death in May of Wolfgang Höll who was a well respected colleague and friend of many in the ion exchange community. As you will see from Michael Street’s obituary below his contribution to ion exchange theory and applications in water treatment was extensive and ion exchange has lost a very influential teacher and researcher.

Obituary:

Wolfgang Höll (1944-2010)

The ion exchange community lost one of its great researchers when Wolfgang Höll died suddenly on 11 May 2010. Wolfgang was born on 4 April 1944 in Ettlingen, Germany and studied chemical engineering at the University of Karlsruhe graduating as Dipl-Ing in 1971. He obtained his Dr-Ing in 1976 under the supervision of Professor H Sontheimer and became Dr-Ing habil in 1985 and ultimately Professor Dr-Ing habil at the University of Karlsruhe. He worked for his entire career at the Karlsruhe Research Centre, in the former Institute for Technical Chemistry, Section for Water Chemistry and Geochemistry rising from Research Group Head to Acting Director of the Institute. His principle research interests were adsorption, ion exchange and soil/groundwater remediation. His research activity was vast and covered an impressive range of frontiers projects, in particular the use of carbon dioxide for regeneration of weak acid ion exchangers, development of non-polluting ion exchange processes for partial demineralization of water based on the use of carbonic acid for regeneration, development of processes for the removal of trace heavy metals and other inorganic trace contaminants from waste water and from drinking water supplies, research on the performance of heavy metal complexes in ion exchange columns for separation of mixtures, separation of mixtures of heavy metals by means of Parametric Pumping, elimination of heavy metals from waste water by means of novel precipitation systems, modelling of sorption processes for multispecies ion exchange equilibria based on the surface complexation theory, elimination of organic compounds from water by adsorption onto activated carbon, development of adsorbents and sorption processes using sorbents from organic waste materials, removal of heavy metals from contaminated solids (soil, sediments, rubbish material), application of novel magnetic separation processes for the removal of hazardous heavy metals from waste water.

Wolfgang forged many international collaborations during his career across the four quarters of the globe. Amongst these many associations, he worked with research groups at Tsinghua University, Beijing, on the application of carbon dioxide-regenerated ion exchangers for the combined removal of hardness, sulfate, and nitrate from water, removal of trace heavy metals from raw drinking water supply in China using weakly basic anion exchangers and
simultaneous elimination of nitrate and pesticide from contaminated raw waters. He also worked with CSIRO Australia in Melbourne, on the development and application of magnetic micro-ion exchangers for removal of heavy metals from drinking water and industrial waste waters; with the Institute of Physical Chemistry, Moscow on the prediction of the column breakthrough performance of ion exchanger filters based on the surface complexation theory; with Yildiz Technical University, Istanbul, on the development of methods for removal and recovery of chromium from tannery waste water, synthesis and application of novel micro and nano scale sorbents to water and process technology; with the Federal University of Minas Gerais, Belo Horizonte, Brazil, on the removal of arsenic from drinking water in mining areas; with the Institute of Macromolecular Chemistry, Iasi, Romania, on the development of novel heavy metal-selective ion exchangers; with the Federal University of Minas Gerais, Belo Horizonte, and other Brazilian Universities on various water related projects; with the Graduate Institute of the National Taiwan University on removal of fluoride from drinking and industrial waters, the removal of pesticides from drinking water, and the development and application of magnetic inorganic micro sorbents for elimination of inorganic and organic pollutants from waters; with Victoria University of Wellington, New Zealand on the development of magnetic microsorbents; with the Polytechnical University Bucharesti and Institute of Macromolecular Chemistry, Iasy, Romania on the development of novel heavy metal-selective ion exchangers.

I have fond memories of our enjoyable collaboration in a Brite-Euram collaborative research project funded by the European Community that involved Wolfgang in Karlsruhe, Jukka Lehto in Helsinki and myself in Loughborough as team leaders. We each engaged several young post doctoral and PhD researchers to work on the development of ion exchange process technology for the treatment of metal waste effluents. The project was a scientific challenge but also a marvellous networking opportunity for the academic staff, students and industrial partners. Regular meetings were organised in Loughborough, Karlsruhe and even in the frozen wastes of Lapland. The latter venue enabled us to enjoy some exciting skiing and exhilarating saunas as guests of the Finnish team. Wolfgang was an inspirational collaborator and a charming, delightful person. He emanated a relaxed and comfortable disposition, either when he was teaching or advising his contemporaries and/or students. He had a special relationship with his PhD students treating them as research partners and helping them not only in academic matters but advising and supporting them in their personal lives. Wolfgang was an accomplished sportsman with an affection for soccer that we both shared but most of all he loved swimming. He collected several swimming trophies in his younger years and never failed to find the beach on his many trips abroad so that he could take a dip in the sea. He also loved to play the piano and had a passion for classical music. His casual competent manner brought him so many friends and admirers in countries across the world.

Wolfgang held many Visiting Professorships; at the National Taiwan University, Taiwan, Institute of Environmental Engineering (2003-2007); Universidade Federal de Minas Gerais, Brazil, Department of Metal Engineering and Materials (2003); Universidade Catolica de Pernambuco, Recife, Brazil, Department of Chemistry (2005) and the National Cheng Kung University, Tainan, Taiwan, Resource, Recycling and Management Research Centre, (2006).

His eminence and esteem in the field of adsorption and ion exchange technology was recognised by the Society of Chemical Industry in London by a special award from the Separation Science and Technology Group in 2004. Although he had just retired from his position at the University of Karlsruhe he was still immensely active and busily engaged in
collaborations with his many international colleagues. He was diagnosed with acute
leukaemia in January 2010 and was gradually recovering from a course of intense treatment
when he had a sudden relapse and sadly passed away. He is mourned and will be greatly
missed by all his friends, colleagues, former students and everyone who benefitted so much
from his expertise and generous kindly manner. All of his friends and associates send
condolences to his wife Ursula and his children and hope that they will be comforted by the
knowledge that he will be ever remembered with respect in the ion exchange and chemical
engineering community.

Professor Michael Streat FREng FIChemE
Emeritus Professor of Chemical Engineering, Loughborough University
Visiting Professor, Imperial College London

Awards:

Michael Gottlieb gets a Prestigious Award from the Water Quality Association

The WQA presented Mike Gottlieb, President and Founder of ResinTech, Inc. the Lifetime
Member Award at its annual convention and trade show in Orlando, Florida last month. This
award is given for “exemplary service to the association and knowledge and
accomplishments in the field of water quality.”

WQA stated: “The list of publications, seminars, task forces, committees and boards
that Mike has been deeply involved in can hardly be added up. Any list would not even begin
to demonstrate Mike’s energy, enthusiasm, and impact. Mike has spent more than four
decades sharing his knowledge and ideas. His tireless devotion to our industry products can
be seen in more than 75 publications and scores of committees he has served on nationally
and closer to home. Mike has enriched our industry in so many ways.

Mike and Lynne have recently become residents of Delray Beach, Florida.

Meetings and Conferences

5th International Conference of Ion Exchange (ICIE 2010) – July 2010

The 5th International Conference on Ion Exchange was held on July 18th to 21st at the
University of Melbourne. The conference drew over 140 delegates from around the world
but mainly from Japan and Australia. The technical program was anchored by four excellent
keynote presentations: Paul Haddad from Australia spoke on new developments in ion
chromatography; Akinori Jyo of Japan presented on bifunctional chelating fibres for uptake
of heavy metals; Nalan Kabay of Turkey addressed the topic of coupling ion exchange with
ultrafiltration for boron removal while Keisuke Ohto of Japan discussed the preparation of
novel ion exchange resins containing calyx[4]arene tetracetic acid derivatives. The
technical program also contained excellent oral and poster presentations. A technical tour to
the Veolia Water Australia facility in Bendigo was a feature of the last day of the conference.
The conference was organised under the auspices of the Japan Association of Ion Exchange.
Hosted by the University of Melbourne the conference chairs were Geoff Stevens and David
Shallcross from Australia and Yu Komatsu and A. Jyo from Japan. This was the first time
that a conference in this series had been held outside Japan. Following the success of the
conference it was decided to hold the 7th ICIE in Jogjakarta, Indonesia in September 2018. The 6th ICIE will return to Japan in 2014.


David Shallcross

**Permea 2010; Tatranské Matliare, Slovakia; 5th – 9th September 2010**

Details of this meeting were included in the last Newsletter and can be downloaded from: [http://sschi.chtf.stuba.sk/permea2010](http://sschi.chtf.stuba.sk/permea2010). This site only contains the initial information but for those interested in obtaining the latest information the contact addresses are:

- for programme issues: stefan.schlosser@stuba.sk
- for organization issues: permea@chtf.stuba.sk

**Ion Exchange Workshop (IEX 2011); Barcelona, Spain, 2011**

Following the previous successful meeting in Antalya it was hoped to hold another meeting next year in Barcelona; however because of the financial situation in Europe and elsewhere it has proved impossible to obtain financial support for this meeting and so it has been decided to cancel this workshop.

The International Committee at its next meeting at IEX2012 will have a full discussion on the role of Workshops and the possibility of holding such events in the future.

**International Solvent Extraction Conference (ISEC2011); Santiago, Chile, 17th – 21st October 2011**


Although the date for submission of abstracts has now past if you are interested in presenting a paper the appropriate person to contact for information is:

Ms Mallory Dutton, Event Coordinator, Phone: (56-2) 652-1543; Fax: (56-2) 652-1570; Email: isecc@isec2011.com

**IEX2012; Cambridge, U.K. 19th – 21st September2012**


Also note that following the success of the pre-conference training course on water treatment at IEX2008, this and other courses are planned for 2012. If you are interested in attending any of these proposed courses the organisers would welcome an early expression of interest to assess viability.
Following the success of ICIE 2010 an Organising Committee for a conference to be held in Japan has been formed with Prof M. Goto (Kyushu Univ.) and Prof K. Yoshizuka (Kitakyushu Univ.) as Chairmen.

**Industrial News**
(The following items have been submitted by the companies involved and are included for information. MC)

**LANXESS - A highlight of the Water Year 2010**

Using chemistry and know-how to protect an essential resource

**Leverkusen** – A growing world population, environmental pollution, climate change and wells that are drying up will make water as valuable as oil in the next few decades. First called into being by the United Nations in 1992, World Water Day on March 22 serves as a reminder that the elixir of life is a scarce resource in many parts of the globe. "At LANXESS, we have named 2010 the Water Year – and this day is one of the highlights," says Axel C. Heitmann, Chairman of the Board of Management of LANXESS AG. "World Water Day gives us an opportunity to reaffirm the need to adopt a responsible attitude in dealing with a resource that is crucial to our very existence."

LANXESS is aiming to draw attention to the world’s water issues by launching activities at its sites around the globe. Projects in Germany will include school children from North Rhine-Westphalia working together from March 22 to 24 to develop concepts based on the EU water guidelines as part of the LANXESS education initiative. "We want to encourage school children to think outside the scientific box. After all, the equal distribution of water doesn't just pose a technical problem, it's often also a social issue," comments Rainier van Roessel, Member of the Board of Management and Industrial Relations Director of LANXESS AG. The company is also planning to run further school projects in South Africa, India and the United States during the year to help school children develop solutions for local water issues.

In India, representatives from business and politics will come together at a water symposium to discuss ways of tackling water pollution in the country. At other sites in China, South Africa and the United States, LANXESS will initiate talks to discuss local water problems and devise much-needed solutions. The company will pool the results in a single global document.

**Commitment in Bangladesh and Tanzania**

The positive experience of the "Water Purification in Bangladesh" project launched in 2006 with students from the University of Cottbus has inspired LANXESS to work with young people to develop solutions. This project is devoted to filtering arsenic out of drinking water. Some very high concentrations of arsenic occur in the groundwater in many regions of Asia, but also in the United States and South America. Arsenic pollution is one of the most dangerous forms of drinking water contamination. In these regions, it is not unusual for measurements of several milligrams of arsenic per liter to be recorded. The World Health Organization (WHO) recommends that water should contain no more than 10 micrograms – a concentration one thousand times weaker. Now in operation in Bangladesh, mobile filter systems filled with iron oxide Bayoxide E33 from LANXESS are easy to use and purify the water quickly and cost-effectively.

In Africa, too, people are reliant on support to ensure they have access to drinking water. In 2008, LANXESS and the *African Medical and Research Foundation* (AMREF) launched a joint project with the aim of cutting the high disease and mortality rate in Tanzania resulting from unclean water and inadequate hygiene. Through a combination of financial support and LANXESS expertise, 25 schools are being equipped with rainwater treatment systems and sanitary facilities. Once the
project is completed, around 10,000 children will benefit from access to clean water and hygienic sanitation.

**Combining tradition and innovation to solve global water issues**

LANXESS products are in use worldwide in virtually every branch of industry to treat water and ensure this valuable raw material is used efficiently. This applies equally to drinking water, wastewater, groundwater and the water used in industrial processes. For over seven decades, high-performance ion exchange resins from the Lewatit range have played their part in resolving water issues worldwide. Among other things, the exchange resins remove toxic impurities from drinking water, such as heavy metals, and other harmful substances including nitrates, arsenic and borate. Ion exchange resins are also an integral part of industrial processes in which vast amounts of water can be saved through water recycling. Lewatit products also have a broad range of application in wastewater treatment in the metal-processing industry, for example. In addition, they can be used to treat groundwater, primarily by removing chromate and cyanides. "At its site in Bitterfeld, Germany, LANXESS with its significant investment of EUR 30 million in membrane filtration technology, will be in a position to offer additional water treatment products as of 2011, thus expanding our already strong market position," states Heitmann.

Dripping taps in many industrialized countries lead to the loss of more drinking water than some regions of the world have available to supply the entire local population. When it comes to transferring liquids flexibly from one location to another or sealing moving parts in machines, rubber is virtually indispensable. As one of the world's leading manufacturers of synthetic rubber, the products supplied by LANXESS include Buna EP for elastic rubber seals in dishwashers and EPDM membranes used during biological treatment stages in water treatment plants, and heat-, pressure- and chemical-resistant high-performance seals made of Therban for household appliances and industrial applications.

LANXESS also provides innovative water softening solutions. Wherever water is required – in industry or in the home – dispersing and complexing agents are needed to ensure it can be used more efficiently. Biodegradable products from the Baypure range prevent the build-up of limescale in washing machines and dishwashers, dissolve stubborn furring in drainage pipes and assist in oil extraction.

"However, LANXESS is more than just a recognized supplier of specialty chemicals, ion exchange resins and synthetic rubbers. We also share our expertise with our customers," points out Heitmann. "That's another way we can help them save water and, in particular, reduce the contamination of wastewater. Given the rising cost of wastewater treatment, this makes production processes more cost-effective." For example, numerous products developed for use in leather production create a much more efficient manufacturing process from an ecological perspective, thereby reducing wastewater contamination. They also help to reduce the volume of water used during the manufacture of leather.

**Acting responsibly to conserve natural resources**

For LANXESS, conserving natural resources through the most efficient possible use of raw materials and energies, and achieving cuts in emissions and waste is an ongoing mission. That mission is part of its global corporate commitment to mankind and the environment. "Our know-how and our products are helping to purify water, save water and ensure this essential resource is used more responsibly worldwide," says Heitmann. Examples that support this claim can be found in all corners of the globe, including Porto Feliz in Brazil, Jinshan in China, La Wantzenau in France and Nagda in India.

Iron oxide production in Porto Feliz, for example, now consumes up to 50 percent less water than just a few years ago. The LANXESS iron oxide plant in China is a further example of Responsible Care in practice. Opened in 2007, it is one of the very first such facilities in China to have a state-of-the-art wastewater treatment system. On top of this, the specialty chemicals group manages to save up to 1.5 million liters of water here each year through intelligent use of cooling water.
In La Wantzenau, LANXESS started to take wastewater treatment technology to a new level back in 2006. Following investment worth approximately EUR 5.5 million, the company's engineers were able to reduce the solids content of the wastewater by around 40 percent. At its site in Nagda, LANXESS went as far as to collect wastewater from the surrounding area in order to clean it and use it as process water. This initiative earned LANXESS an award from the Indian Chemical Council.

Heitmann concludes: "Our goal is to initiate and support developments, but also to be proactive in seeking solutions as far as our economic capabilities permit – after all, manufacturing methods that conserve resources are of benefit to us, too."

Chemistry and know-how in the fight against arsenic in drinking water

LANXESS presents latest research findings at international congress in Taiwan

Leverkusen – Water is the most important substance of all to life. Specialty chemicals group LANXESS is highlighting the overriding importance of this substance with a variety of activities complementing its chemistry and know-how as part of its "Year of Water 2010" initiative. This includes the company’s contribution to the 3rd International Congress on Arsenic in the Environment, which takes place in Tainan, Taiwan, from May 17 to 21.

In his congress presentation, LANXESS chemist Dr. Stefan Neumann, Manager Technical Marketing and Chemicals Purification at the Ion Exchange Resins (ION) business unit, showcases recent research using a new hybrid adsorber for treating drinking water. Plastic-based Lewatit FO 36 grade hybrid adsorber, modified with a special, nanoscale iron oxide, allow highly efficient and selective removal of arsenic from drinking water. Arsenate and arsenite ions are attached via a covalent bond to the iron oxide surface and are thereby removed from the surrounding water. Product development was successfully completed in 2008 and the experts involved were honored the following year with the LANXESS innovation award in the ecology category. LANXESS is one of the world’s leading manufacturers of ion exchange resins and expects to see above-average growth in the future, particularly in water treatment.

“We have presented a technical concept in Taiwan to also remove arsenic from water containing large amounts of silica. This was previously only possible to a limited extent,” says Neumann, explaining one of the current research areas. Laboratory tests also showed that the hybrid adsorber can be used to fill filter cartridges and – as in standard cartridges for softening water – be deployed on a localized basis in the home or on the move. One single cartridge containing only around 0.1 liter of adsorber was used to treat around 1,200 liters of water over three months. This cut arsenic content from approximately 100 ppb (100 micrograms per liter) to less than 10 ppb.

Lewatit FO 36 ensures reliable compliance in many cases with the maximum permitted value of arsenic in drinking water of 10 ppb recommended by the World Health Organization (WHO) and already laid down in numerous countries. In parts of the United States, Chile, the United Kingdom and other countries, higher concentrations occur in groundwater and surface water. This is mainly due to the washing out of natural mineral sources and, to a lesser extent, to anthropogenic influences such as wastewater from mining and industry. Arsenic is highly toxic to higher organisms and humans. Changes to the skin and other damage to health, culminating in cancer, are particularly prevalent in the case of long-term exposure. Yet many millions of people throughout the world remain dependent on drinking water that contains more than 50 ppb arsenic. This is the case in countries such as India, China and Bangladesh.

The hybrid adsorber developed by LANXESS can provide an effective remedy in these instances. As a dust-free, flowable substance with a standard grain size and excellent mechanical stability, the product is perfectly tailored to the requirements of industrial water treatment. After the saturation limit has been reached, it can be regenerated with lye, enabling it to be used repeatedly in an eco-friendly, cost-effective way. Lewatit FO 36 is currently being used at a total of three facilities in Italy and Germany to remove arsenic from well water. This water can then be safely used as drinking water by several thousand people.

An overview of research findings and field tests on Lewatit FO 36 is provided by a new article that will shortly be appearing in Volume 2 of the series “The Global Arsenic Problem:
Challenges for Safe Water Production”, entitled “Arsenic in the Environment”. This multi-volume monograph focuses on the “insidious poison” arsenic and investigates appropriate measures to remove it from the food chain, particularly from drinking water.

Further technical details on Lewatit FO 36 and its use in removing arsenic from drinking water are included in a brochure available for download at www.lewatit.com.

With granulated iron oxide hydroxides from the Bayoxide E33 series, LANXESS, one of the world’s leading manufacturers of inorganic pigments, offers a further effective alternative for removing arsenic from drinking water following a similar principle. In conjunction with a solid bed adsorber technology, these granules have already been successfully used around the world for many years.

DOW™ ULTRAFILTRATION AWARDED WATER RECYCLING/REUSE CERTIFICATION

DOW™ Ultrafiltration SFP-2880 module certified for water recycling and reuse applications by California Department of Public Health

Certification reaffirms Dow’s commitment to sustainable practices around recycled water

MINNEAPOLIS – January 19, 2010 – Dow Water & Process Solutions, a business unit of The Dow Chemical Company (Dow), announces the acceptance of the DOW™ Ultrafiltration SFP-2880 module for water recycling applications. The approval certifies DOW Ultrafiltration as an acceptable filtration technology in compliance with the California Water Recycling Criteria (California Code of Regulations, Title 22).

California Water Recycling Criteria recognizes membrane filtration as an acceptable filtration technology provided prescribed performance requirements are reliably met. Performance criteria through testing must demonstrate the filtered wastewater not exceed 0.2 NTU more than five percent of the time within a 24-hour period and 0.5 NTU at any time.

"Receiving this certification from the State of California for our highest productivity pressurized ultrafiltration element reaffirms Dow’s commitment to sustainability," said Fabrien Creus, strategic marketing manager for Dow Water & Process Solutions. “Water scarcity and quality are two significant issues facing our world today, and we’re pleased that our high-quality ultrafiltration technology is setting the standard around recycled water.”

The DOW Ultrafiltration SFP-2880 offers 50 percent more membrane active area while decreasing the required system footprint by 30 percent. The SFP-2880 adds 20 inches of length when compared to the DOW™ Ultrafiltration SFP-2860, but allows flexibility in system design by reducing the number of modules, required piping, skid infrastructure, and the size of the compressed air and clean in place systems. In addition, the larger modules produce a smaller waste stream for disposal.

This technology is the same 0.03 µm hollow fiber membrane and pressurized ultrafiltration module that was tested and certified under NSF/ANSI 61 for use in drinking water installations. To learn more about DOW™ Ultrafiltration membranes visit www.dowwatersolutions.com.

About Dow Water & Process Solutions
Dow Water & Process Solutions has a 50 year legacy of providing innovative water and process solutions to both communities and industries alike. A differentiated business unit of The Dow Chemical Company, Dow Water & Process Solutions offers a broad portfolio of ion exchange resins, reverse osmosis membranes, ultrafiltration membranes and electrodeionization products, with strong positions in a number of major application areas, including industrial and municipal water, pharmaceuticals, power, residential water and wastewater and water reuse. More information about Dow Water & Process Solutions can be found at www.dowwatersolutions.com.

About Dow
Dow is a diversified chemical company that combines the power of science and technology with the “Human Element” to constantly improve what is essential to human progress. The Company delivers
a broad range of products and services to customers in approximately 160 countries, connecting
chemistry and innovation with the principles of sustainability to help provide everything from fresh
water, food and pharmaceuticals to paints, packaging and personal care products. In 2008, Dow had
annual sales of $57.4 billion and employed approximately 46,000 people worldwide. The Company
has 150 manufacturing sites in 35 countries and produces approximately 3,300 products. On April 1,
2009, Dow acquired Rohm and Haas Company, a global specialty materials company with sales of
$10 billion in 2008, 98 manufacturing sites in 30 countries and approximately 15,000 employees
worldwide. References to "Dow" or the "Company" mean The Dow Chemical Company and its
consolidated subsidiaries unless otherwise expressly noted. More information about Dow can be
found at www.dow.com.

For further information, please contact Karen Jayne Leinberger, The Dow Chemical Company, at
+952.897.4364, kleinberger@dow.com.

INEOS NOVA
Announces Launch of CLEARBLEND™ Resin in North America

On May 3, 2010 INEOS NOVA announced the launch of their new CLEARBLEND™ resin in North
America. “CLEARBLEND resin is a line of clear, impact-modified styrene acrylic copolymers for
injection molding applications and is engineered to provide a cost effective balance of clarity and
toughness,” said Ed Barnes, Vice President – North American Polymers.

“CLEARBLEND resins offer the same advantages of ease of processing, low specific gravity, and
low moisture content our other clear High Performance Styrenic product lines NAS® and ZYLAR®.
These are advantages that can make a significant contribution to overall sustainable results through
source reduction and lower energy consumption,” Barnes said. CLEARBLEND resins, like all INEOS
NOVA High Performance Styrenic products, are manufactured without bisphenol-A or phthalates to
benefit applications like housewares, drinkware, toys, and various device components where
toughness and clarity is needed.

The launch of CLEARBLEND resin demonstrates the commitment of INEOS NOVA to being an
industry leading and customer focused organization, delivering consistently innovative, high quality
products and services.

For more information, please contact INEOS NOVA at +1 866 890 6353 (toll free) or +1 815 423
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