International Committee for Ion Exchange

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Content:  
This Newsletter contains a full report of the Ion Exchange Conference IEx 2012 and preliminary notification of the next conference to be held by the Japanese Association of Ion Exchange in Okinawa, Japan in 2014. I am always happy to include notification of any relevant meetings and conferences but because the Newsletter is only distributed annually early notification is usually necessary. But having just organised IEx 2012 I realise how important it is to ensure that information reaches the right people and so I would also be willing to circulate at short notice such information using this distribution list.

Recent Newsletters have included obituaries of some eminent ion exchange scientists and another is included below. The ion exchange community is rather small and we tend to know of a number of members through conferences and publications so if members would like to submit obituaries of scientists from their community I will happily include them.

The Newsletter also includes some Press Releases from Lanxess, who regularly include me on their circulation lists. If other ion exchange companies send me press releases of relevant information I will include them.

Obituary:  
Professor Francis Louis Dirk (Frikkie) Cloete  (A Personal Tribute)

Frikkie Cloete passed away peacefully on 4 June 2012 in Stellenbosch, South Africa after bravely suffering from Alzheimer’s Disease, a debilitating illness, for many years. He is survived by his wife Ann, son Adrian and daughter Alison.

Frikkie arrived in the UK in the late 1950’s shortly after graduating with an MSc degree in chemical engineering from the University of Capetown. His first employment was in the chemical engineering division of the United Kingdom Weapons Research Establishment (UKWRE), Aldermaston, Berkshire. This quickly introduced him to the intricate process technology required in the formative years of the development of nuclear technology in this country. His expertise in sophisticated research and development evolved quickly and he decided to move into private industry and joined a nuclear contracting company, Nuclear Chemical Plant Limited, (NCP) in Ealing, London. NCP was a private contractor that supplied specialist plant designs and procured equipment for the UK nuclear industry.
In 1961 he joined the Nuclear Technology Group in the Department of Chemical Engineering and Chemical Technology, Imperial College, London as a Lecturer in chemical engineering. His background and skills in design were a vital addition to the embryonic nuclear technology team in the department and he immediately developed a series of outstanding lectures that augmented the new full-time one year MSc course in nuclear technology that was attracting a large number of UK sponsored graduate students together with an impressive cohort of sponsored graduate entrants from across the Commonwealth and the rest of the world.

He also threw himself into research at a time of fast moving advances in the processing of uranium and spent nuclear fuel reprocessing. In 1961, I had just completed a PhD in the field of ion exchange technology applied to nuclear technology and it was fortuitous that Frikkie immediately collaborated in a venture to revisit early work in the USA on continuous ion exchange equipment in an attempt to develop an entirely new and innovative approach. Our collaboration was immensely fruitful and led us to the development of a novel multi-stage fluidised bed contactor for the recovery and concentration of uranium.

Frikkie Cloete was a brilliant chemical engineer with a flair for innovation and sometimes lateral thinking in the design of chemical process plant and equipment. He was meticulous in the detailed design and painstaking in the practical demonstration of ideas often resorting to elegant small-scale pilot trials. We made an excellent team and worked together during a most exciting period in the advance of ion exchange during the 1960’s. Frikkie believed in protecting intellectual property as early as 1961 when this was not really encouraged at university and openly frowned upon by our superiors. Nevertheless, he encouraged me to seek letters patent jointly with him for our initial idea that later became known as the “Cloete-Streat” concept of continuous ion exchange. Neither of us made our fortune, but the patents gave us immense credibility amongst the industrial ion exchange community.

Frikkie returned to his homeland in 1969. In many ways this was an inspired decision since it enabled him to move immediately into the mainstream of uranium production technology. He joined the National Institute for Metallurgy (NIM) in South Africa and promptly started to work on a programme of large-scale development of continuous ion exchange in a vastly enhanced team of experienced chemical engineers. Very quickly, NIM engineers had built and commissioned a demonstration CIX contactor and this was a prelude to the ion exchange revolution in uranium processing on many South African gold mines.

Frikkie was responsible for more technical innovations in ion exchange technology such as the early pioneering work on the resin-in-pulp process for the recovery of uranium from unclarified liquors. He moved from NIM (now Mintek) and joined CSIR in Pretoria working on several diverse R & D topics before returning to an academic post in the Department of Chemical Engineering at University of Stellenbosch. Frikkie enjoyed working under his own initiative, collaborating with an occasional colleague and supervising his students. He could be a hard task master but always fair and considerate. His teaching was thorough and inspiring in his chosen specialities. He showed immense determination and could not be easily persuaded by ill-thought out ideas. I have the fondest memories of the many hours we spent intensely discussing joint ideas in our shared office at Imperial College, often forgetting lunches and even the time to knock off and go home. Over the 50 years of our friendship and the vast distance between us, we remained in contact and maintained the closest academic relationship.

In his younger years in London, Frikkie enjoyed playing squash as a relaxation and was an outstanding player. He challenged all-comers, especially his university colleagues and any student who dared to pick up the gauntlet. His other great passion was sailing and he and Ann spent many happy weeks cruising along the coast of South Africa over the 25 years prior to his illness. He was a man of immense scruple and dignity and I know that his strong Christian belief served him well during his most difficult final years. He should be remembered by the chemical engineering community and especially the ion exchange fraternity for his legacy of innovative research and development, teaching and service to industry.

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

**IEx 2012 (Cambridge, U.K.) 19 – 21 September 2012**

The latest in this series of Society of Chemical Industry (SCI) conferences that have been held every four years since 1976 took place at Queens’ College Cambridge in September. Twenty-six countries, including for the first time Chile and Venezuela, were represented among the over 160 delegates. The wide appeal of this conference was demonstrated by the almost equally distribution of participants from academia (51%) and industry (49%) which led to fruitful discussions during and outside the formal sessions. The programme of the 2½ day meeting was organised in two parallel sessions to accommodate the 51 oral presentations and in addition 34 poster papers were displayed. The topics covered included applications in: Industrial and Potable Water Treatment, Hydrometallurgy, Environment, Catalysis, Nuclear Power Generation and Biofuels and, in addition papers were presented on: Fundamentals, Adsorbents and Novel Extractants. For the first time, rather than producing a hard copy of all the papers, extended abstracts were published in hard copy with the full final papers distributed in electronic form. This arrangement gave delegates a hard copy for use during the conference and also provided authors with freedom from any page limitation and allowed the use of colour and later submission of material. This new arrangement seemed to gain approval from the delegates and certainly helped the Organising Committee.

Included in the presentations there were four papers on technologies to clean-up radioactive contamination following the Fukushima incident in Japan and also a review of the developments in the application of ion exchange in hydrometallurgy. It is hoped to publish these papers in the Journal of Chemical Technology and Biotechnology in 2013.

Since the last Conference in 2008 the deaths occurred of members of the European ion exchange community, Professor Wolfgang Höll and David Naden. Wolfgang was a regular attendee at these conferences and was a valued member of the International Committee. For his help over many years he was awarded the SCI Ion Exchange Award in 2004. David Naden was first associated with IEX in 1984 when he was co-chairman. He continued to be involved in these meetings and at the time of his death he was Chairman of the IEX2012 Committee and in recognition of his services to the Separation Science and Technology Group and the IEX conferences he was posthumously awarded the SCI Distinguished Service Award. For their contribution to the application of ion exchange Wolfgang and David were recognised at this conference by tributes from colleagues and the dedication of the sessions in their honour on respectively Water Treatment and Hydrometallurgy.

At the meeting SCI Ion Exchange Awards were presented to: Professor Nalan Kabay, Ege University, Turkey; Professor Yu Komatsu, Kanasawa Institute of Technology, Japan, and Dr Emmanuel Zaganiaris, Dow Water and Process Solutions, France.

Prof Kabay

Prof Mimura accepted the Award on behalf of Prof Komatsu

Dr Zaganiaris
Through the generosity of John Wiley and Sons and the SCI, student prizes were awarded to: Ms Kanato Sibata, University of Kitakyushu, Japan and Dr Özgur Arar, Ege University, Turkey for their oral presentations and Ms Evelein van de Steene, University College, Ghent, Belgium and Mr Julio Bastos Arrieta, University Autonoma de Barcelona, Spain for their poster papers.

Following the precedent set at IEX2008 the conference was preceded by ion exchange technical training courses given by experts in the application of ion exchange in industry. The topics covered were: an introduction to industrial water treatment, a revised repeat of the 2008 course; an advanced course on ion exchange covering basic plant design for demineralisation, monitoring performance and troubleshooting plant problems, and a new third course on the theory and practice of ion exchange in bioprocessing. All these three courses were well attended and elicited favourable responses from the attendees.

A meeting of the International Committee for Ion Exchange was held at the conference and after discussions with the Organising Committee it was decided to hold the next IEX conference in 2016 at Cambridge. The continued success of the ion exchange training courses led the Organising Committee to decide there was a strong case to repeat these before the next IEX so it is hoped to hold them again in the UK in 2014. Anyone interested in receiving further information of these or IEX2016 can register with the SCI Conference Office (conferences@soci.org).

Professor Emeritus Michael Cox
Chairman Organising Committee IEX2012

**ICIE 2014 (International Conference of Ion Exchange) 9 – 12 November 2014**

The next conference in this series organised by the Japan Society of Ion Exchange (JSIE) will be held in the Okinawa Convention Center, Okinawa, Japan.

**Call for papers:**

Oral and poster papers are invited on all aspects of ion exchange including applications in:

- Environmental; Metal separation and recycling; Nuclear processing; Water treatment;
- Biology and Bioseparations;
- also: Plant and equipment design; Catalysis; Solvent extraction; New adsorbents.

**Further information:**

Final details of the conference will be uploaded when available to the conference website: (http://www.jaie.gr.jp/01english/index.html)

Professor Masahiro Goto
Head of Organising Committee.
February 2013.

**Industrial News:**

**Lanxess**

- **Combined system design with LewaPlus**

The LewaPlus design software is a comprehensive tool for ion exchange resins (IX) and reverse osmosis (RO) membrane systems. LewaPlus allows dimensioning of IX and RO systems under a variety of system configurations, including some unique process configurations only available with Lewatit and Lewabrane product technology.

LewaPlus design software provides a number of unique benefits to the designer:
A new user interface to assist in organization of design project files, and linkage to data sheets and MSDS documentation (for IX)

- A single water analysis data entry screen, with RO scaling calculations, suitable for both IX and RO applications
- Advanced RO system configuration options with automatic calculation of a recommended array for optimization of system sizing
- Immediate calculation of system performance, including feed pressure calculations and permeate quality on a single screen in the RO module
- Output of IX and RO system design parameters and effluent (permeate) quality in an easy to manipulate printed output

LewaPlus software also allows the designer to conduct both IX and RO designs inside the same program utilizing the same feed water, allowing seamless design of RO permeate to IX feed, or a direct comparison of dimensioning requirements of either technology.

**Hardware requirements**

LewaPlus is a 32-bit Windows application. It runs on Windows XP, Windows Vista or Windows 7. There are no specific hardware requirements, but it is recommended to use a screen size of at least 1024 x 768 pixels.

Detailed information can be found on the website: (www.lewabrane.com)

- **Membrane technology for water with fouling potential**

  **LewaPlus design software now also for reverse osmosis with downstream ion exchanger**

LANXESS is offering three new types of Lewabrane membrane separation elements for reverse osmosis. The new products are available now for waters with strong fouling potential. The new membranes have a surface area of 37.2, 34.4, and 8.4 square meters (equivalent to 400, 370, and 90 square feet). Lewabrane RO B400 FR and Lewabrane RO B370 FR have a diameter of 201 mm (8 inches), while Lewabrane RO B090 FR 4040 has a diameter of 101 mm (4 inches).

  Lewabrane products comprise a polyamide composite membrane, wound in several layers to form a spiral wound element. Furthermore, a special feed spacer has been incorporated in the newly developed FR types. The new membrane elements were designed to generate greater turbulence in the feedwater channel, meaning that fewer solids accumulate on the membrane surface.

  In membrane separation, fouling describes the process by which dissolved solids (colloids) form deposits on the membrane surface, leading to a reduction in separation capacity. The new FR elements from LANXESS reduce this kind of fouling, thereby extending maintenance intervals and increasing output capacity.

  The separation elements, manufactured at LANXESS' Bitterfeld site in Germany, were engineered specifically for industrial water treatment. The fields of application include the desalination of brackish and low-salinity water with a high potential for organic or biological fouling.

- **LANXESS expands software tool for water treatment**

The Ion Exchange Resins business unit has expanded its design tool for industrial water treatment. Using LewaPlus, complete systems can now be designed, for example, employing different separation processes. Dr. Jens Lipnizki, Membrane Applications Manager at ION, explains: “Until now, LewaPlus was only capable of engineering reverse osmosis and ion exchange systems separately. With the expanded version, a reverse osmosis process can now be engineered with a downstream ion exchanger and, if necessary, even with an intermediate degasification system.” This is a typical application for water treatment in power plants.
LewaPlus consequently is the only software application that can design an entire reverse osmosis process with downstream ion exchange, and the only one that can integrate in its calculations post-treatment involving a degasification system or chemical addition. Some industrial applications require the addition of salts to reduce the corrosive properties of the water or to adjust the pH. “Ultrapure water, for example, literally extracts ions from the metal surfaces in a water pipeline, which leads to oxidation and visible damage in the form of corrosion,” explains Lipnizki.

**Seamless design**

The LewaPlus design software is a comprehensive tool for engineering systems that use Lewatit ion exchange resins (IX) and Lewabrane membrane elements for reverse osmosis (RO). The application calculates RO system configurations and their output, including feed pressure and permeate quality. The combination of membrane separation and ion exchange ensures that efficiency and economy go hand in hand. The membrane elements deliver a stable, lower-salinity permeate to minimize the salt load in downstream processes, thus helping to achieve an efficient price-performance ratio.

For detailed information on the LewaPlus design software and to download the application free of charge, go to: [www.lewabrane.com](http://www.lewabrane.com)