

# Newsletter of The Energy Sector

## ENERGY SECTOR UPDATE

Dear Members of the RSC Energy Sector,

It has been a very busy period since our previous Newsletter in April. We have held several meetings of the Committee to discuss the strategic direction of the Energy Sector and to plan our coming activities.

I am pleased to report that following our note in the last Newsletter about opportunities to join the Committee, we have two new committee members. I want to welcome Nigel Mason and Richard Wain who bring their expertise in photovoltaics and nuclear, respectively to the group.

I also want to take this opportunity to remind you of our coming AGM meeting on the 10<sup>th</sup> November in Leeds. This will be held concurrently with a Joint Meeting of the Coal Research Forum, Combustion Division and the RSC Energy Sector titled *Technical and Economic Aspects of Co-combustion of Biomass*. If you are interested in attending, please contact Dr. David McCaffrey, details are on Page 3 of this issue. Prof. Mercedes Maroto-Valer, Chair.

## NEW COMMITTEE MEMBERS

### Dr. Nigel B Mason *CChem FRSC*

I am delighted to join the Executive Committee of the Energy Sector with a primary role to represent the interests and aspirations of the RSC's renewable energy community.



My primary area of expertise is with photovoltaic (PV) solar energy and covers R&D, technology transfer, project management and manufacturing. My 23-year career with BP Solar spanned work in PV cell manufacturing sites in Spain, USA and Australia and R&D in the UK. I am currently a Director of PV Consulting Ltd., a company I established in 2008 to provide expert advice to industry suppliers, technology due diligence for lenders/investors and support to start-up companies.

Whilst the majority of my experience has been in the field of crystalline silicon PV technology, I have also worked with thin-film PV including research on the CdS/Cu<sub>2</sub>S cell whilst at Johnson Matthey (1981-4), the CdTe cell that was developed by BP Solar in the 1990's and the amorphous silicon PV technology manufactured by BP Solar (formerly Solarex).

In recent years I have participated in both UK and European PV roadmap activities including *A Strategic Research Agenda* for the EU Technology Platform and PV/solar energy roadmaps for UKERC, Materials UK, the RSC and Electronics Sensors & Photonics KTN.

I aim to support members' interests in the renewable sector and I'm particularly keen to support start-up companies in the UK. As my career has largely been in the field of PV, I have only a general knowledge of other renewable energy technologies and I welcome support and input from members of the Energy Sector with expertise in these areas.

### Mr. Richard Wain *MRSC*

Like Nigel, I too am delighted to join the Executive Committee of the RSC's Energy Sector and am greatly looking forward to representing the members from the nuclear industry.



I have worked in the nuclear industry for twelve years, all of which have been spent with Rolls-Royce in Derby. I am currently the manager of a group of chemists, metallurgists and materials scientists working on design, manufacture, commissioning and in-service support of Pressurised Water Reactors (PWRs). My own background is in water chemistry and corrosion of PWRs and I would very much describe myself as the archetypal 'Jack of all trades', having been involved in everything from radiochemistry to corrosion inhibitors, and from chemical cleaning to cathodic protection. I freely admit that there are many areas of the nuclear industry that I know relatively little about and I am therefore keen to understand the issues and interests across the whole nuclear industry and ensure that they are reflected in the work of the RSC.

## THE ENERGY SECTOR WEBSITE

The Energy Sector has a website located at [www.rsc.org/energysector](http://www.rsc.org/energysector) which gives the mission and responsibilities of the group as well as forthcoming events in addition to those reported in the Newsletters. RSC members also have the opportunity to network with scientists across the globe, find members in your area, and follow the Energy Sector activities using the MyRSC online community forum at <http://my.rsc.org/home>

## WHAT'S 'HOT' IN THE ENERGY SECTOR

### UK NOW FASTEST GROWING SOLAR MARKET

The introduction of a Feed-in Tariff (FIT) for solar photovoltaic (PV) generated electricity has resulted in the UK becoming the fastest growing PV solar market in 2010. iSuppli Corporation predict that UK PV installations in 2010 will total 96 MWp – that's almost a 10-fold growth on the 10 MWp installed in 2009 (iSuppli press release 30 July 2010). FITs introduced in April 2010 will pay up to 41.3 pence per kWh for 25 years for PV solar generated electricity. Installations completed since July 2009 can retroactively qualify for FIT. In subsequent years UK PV solar growth rates are expected to continue at a more modest rate to reach around 500 MWp in 2014. Despite this activity, the UK will remain a relatively small generator of solar electricity compared to the market leader Germany who installed 3.8 GWp of PV in 2009 and are expected to install a further 8 GW in 2010 to realise a cumulative capacity of almost 18 GWp, sufficient for 2% of electricity demand (IMS Research press release 01 Oct 2010).

Nigel B Mason

### ENERGY GENERATION PATENTS 2009-2010

Patents represent an important indicator of commercial activity in a field; not only must a patent be industrially applicable / useful, but as filing and renewals can be expensive - it is unlikely that an assignee will support an application which gives no potential return for the investment.

The following is a patent map generated for publications from the past year in the US, EP, WO, JP and GB databases on the topic of power or energy generation. In the map, similar patents (based on text content) are clustered together to form peaks - the highest peaks sporting a snowy cap. (Searched as (power or energy) NEAR3 generat\* in Claims, Title or Abstract) using Micropatent's Aureka® system.



Features of the map include the surprising size of the Wind Turbine peak, compared to (say) the Fuel Cell peak. Although not labelled by the software, the small peak top centre relates to photovoltaic technology.

There are two peaks for fuel cells – comprising of publications both with an electrode focus and stack/system focus. Large numbers of documents are related to electrical energy and circuits, rather than what we would traditionally think of as being the meat and drink of the Energy Sector – no attempt has been made to restrict this data to Chemistry only.

The main reason for being interested in this broad overview is that patents imply research activity, which implies commercial/academic activity/expenditure and the foresight that there is, or could be a market – an opportunity for further analysis.

## REPORTS FROM RECENT MEETINGS

### JOINT RSC ENERGY SECTOR / RSC RADIOCHEMISTRY 'SPRING TECHNICAL MEETING'

Burlington House, London, United Kingdom 24<sup>th</sup> June 2010

The meeting entitled *Current Nuclear Power Issues* took place in the RSC Chemistry Centre in June and was well attended with a diverse audience including students, academics, industry representatives as well as other interested parties. This reflected the wide-ranging nature of the expert presentations which surely contained something for everyone. Themes included reactor engineering, future plans and operation as well as the chemistry of Uranium and transuranic elements and challenges related to waste storage and disposal.

The role of Chemistry was highlighted throughout, whether related to minimising corrosion in operational plant, in the exciting and unusual coordination complexes obtainable with U, Np and Pu or in the ultimate fate of wastes in storage. The speakers were candid about the difficulties facing the operation and future deployment of nuclear power facilities, but also indicated the range of employment and research opportunities that such a future would provide. It would be unfair to single out any one speaker from the high-quality presentations as worthy of special mention, as they all gave fascinating insights into their respective fields. It is intended to upload a more comprehensive summary of the presentations to the RSC website so that you can read for yourselves more about the meeting.

### NUCLEAR PLANT CHEMISTRY (NPC) 2010 'INTERNATIONAL CONFERENCE ON WATER CHEMISTRY OF NUCLEAR REACTOR SYSTEMS'

Loews le Concorde Hotel, Quebec City, Canada 3<sup>rd</sup> - 7<sup>th</sup> October 2010

NPC 2010 is the latest in a currently biennial series of conferences that started in Bournemouth, UK in 1977. The conference was attended by 280 delegates from 30 countries and was structured as a series of eleven single sessions covering topics ranging from reactor scientific studies, to plant operating experience, through to advanced reactor designs.

The range of papers presented emphasised the key role played by chemistry in topics as diverse as plant radiation fields and bio-fouling of cooling water systems. The desire to push plant lives out to 60 or even 80 years and the ongoing drive to reduce personnel radiation exposure are the focus of much of the industry's current effort. Consequently, many papers covered the interaction of water chemistry with structural materials and the production, transport and deposition of corrosion products.

One of the key messages from the conference is that the population of nuclear chemists is an aging one. Much needs to be done to ensure that hard-won experience and knowledge are passed on to the next generation to ensure that chemistry plays its full part in the global nuclear renaissance. NPC 2012 will be held in Paris, France, with NPC 2014 in Sapporo, Japan.

Richard Wain

### CO2Chem EPSRC GRAND CHALLENGE NETWORK LAUNCH

Burlington House, London, United Kingdom 7<sup>th</sup> - 8<sup>th</sup> September 2010

A launch event was held in London to mark the formation of an EPSRC Grand Challenge Network on Carbon Dioxide Capture and Utilisation (CCU). The network will focus on creating critical mass in the area of novel chemistry and process technology that can enable CO<sub>2</sub> to be converted into useful products.

Presentations on current research, future opportunities and potential issues with CCU were given by the following members of academia and industry: Jon Gluyas (N8 Research Partnership), Mike North (Newcastle University), Mohammad Zhandi (Corus), Peter Edwards (Oxford University), Sue Ellis (Johnson Matthey), Martyn Poliakoff (Nottingham University), Chris Satterley (E.On), Ian Little (Ineos), Gill Stephens (Nottingham University), with the social science issues covered by Lenny Koh (Sheffield University) and media by Quentin Cooper (presenter of *The Material World* and *Connect* on BBC Radio 4).

The key outcomes of these presentations were that there were a lot of opportunities to create novel chemistry and process technologies, but that energy usage and sourcing must be considered in order for a technology to be considered viable and of low environmental impact. Following the presentations, a series of break-out sessions were used to define the three main topics for focus within the network, these were: Capture, Fine Chemicals and Fuel & Bulk Chemicals. The latter of these will be the topic for the first network discussions, which should happen later this year. Further information can be found at [www.co2chem.co.uk](http://www.co2chem.co.uk).

Chris Satterley

## CALENDAR OF UPCOMING EVENTS

### RSC ENERGY SECTOR CONFERENCE ON CHEMISTRY FOR TOMORROW'S ENERGY WORLD

Venue to be confirmed, United Kingdom April/May 2012

A subgroup of the Committee has been working to move forward the planning for this conference. The objective of the conference will be to answer the question as to how chemical sciences can address energy challenges in the next 10-20 years.

The conference outcomes will be to showcase UK strengths in the chemical sciences related to energy, highlight world leading energy research in UK and possibly publications working with the RSC publications team. Topic sessions are being considered from the RSC Roadmap challenges for the chemical sciences: Energy Efficiency; Energy Conversion and Storage; Fossil Fuels; Nuclear Energy and Waste; Biopower and Biofuels; Hydrogen; Solar Energy; Wind and Water; and Future cities. Committee members, and keynote speakers have been identified.

Further details will be available in due course from the Energy Sector website. We look forward to welcoming your ideas about the conference and your engagement as organiser, presenter, delegate or sponsor!

### 4<sup>th</sup> INTERNATIONAL SYMPOSIUM ON ADVANCING THE CHEMICAL SCIENCES (ISACS 4) – CHALLENGES IN RENEWABLE ENERGY

MIT, Boston, United States 5-8<sup>th</sup> July 2011

Supported by the MIT Energy Club and the RSC Environment, Sustainability and Energy Division, this conference will review the current research developments in renewable energy and highlight future challenges covering bioinspired systems, battery technology, photocatalysis, solar harvesting, electrochemistry and energy storage. Plenary speakers include:

- Hector Abruna, Cornell University, United States
- James Barber, Imperial College London
- Thomas Moore, Arizona State University, USA
- Kazunari Domen, University of Tokyo, Japan
- Gerard Ferey, University of Versailles, France
- Leif Hammarström, Uppsala University, Sweden

Please visit <http://www.rsc.org/ConferencesAndEvents/ISACS/RenewableEnergy/Home.asp> for information on submitting abstracts and registration.

### FURTHER UPCOMING EVENTS

A selection of forthcoming events relevant to the Energy Sector is given below. Please contact the Newsletter Editor if you would like to write a brief article about any meetings you attend.

10<sup>th</sup> November 2010. **Technical and Economic Aspects of Co-firing of Biomass seminar**, University of Leeds, Leeds. Organised by the Combustion Division of the Coal Research Forum and the Energy Sector of the Royal Society of Chemistry where the AGM for the RSC Energy Sector will also be held during this event. Email Dr. David McCaffrey at [mail@coalresearchforum.org](mailto:mail@coalresearchforum.org) for further details.

8<sup>th</sup> February 2011. **Scottish Energy and Environment Conference**, Crowne Plaza, Glasgow, UK. Further details and registering at <http://www.seecon.org.uk/>

6 – 8<sup>th</sup> April 2011. **7<sup>th</sup> Photovoltaic Science, Applications & Technology Conference (PVSAT-7)**, Heriot-Watt University, Edinburgh. Organised by The Solar Energy Society this annual meeting is the premier scientific event for photovoltaics in the UK. For further details please visit [www.pvsat.org.uk](http://www.pvsat.org.uk)

10 - 13<sup>th</sup> April 2011. **First International Conference on Clean Energy**, Convention Centre, Dalian, China. This conference is co-organised by the RSC. For further details and registering go to <http://www.icce.cas.cn>

18 – 20<sup>th</sup> April 2011. **Hydrogen Storage Materials**, Rutherford Appleton Laboratory, Didcot, UK. Further details and registering at <http://www.rsc.org/ConferencesAndEvents/RSCConferences/FD151/index.asp>

8 – 12<sup>th</sup> May 2011. **5<sup>th</sup> International Conference on Clean Coal Technologies (CCT2011)**, Zaragoza, Spain. The conference will include clean coal technologies, developments in carbon capture, zero emissions technologies and utilisation of low grade coals. Deadlines for abstracts is 30<sup>th</sup> November at [www.cct2011.org](http://www.cct2011.org)

17 – 20<sup>th</sup> July 2011. **The 7<sup>th</sup> International Symposium on Coal Combustion (7<sup>th</sup> ISCC)**, Harbin P.R China. Further details on submitting papers and registering can be found at [www.7thISCC.net](http://www.7thISCC.net)

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