

Mad about



David Bott's career in materials spans over 30 years, working for the likes of British Petroleum, Courtaulds and ICI Acrylics. Excited about his new role as Chief Executive of Materials UK, which is owned by and serves the materials community, he talks to Rupal Mehta about the organisation and the world of materials.

Materials UK (L-R): Chief Executive David Bott, Chair Wyn Jones OBE and Honorary President Lord Haskel

What sparked your initial interest in materials?

There was a book that I read at about 14 years of age – I think it is called the *Bright Red Businessman*. In it there was a description of 'elastic water', which is a solution of high molecular weight polyethylene oxide. The unusual thing about it is that it behaves as much like a solid rubber as a liquid. If you were pouring elastic water from one container to another and you put the containers down, the water would continue to siphon over. If you are pouring it and you cut the string of liquid, the top bit snaps back.

Early on in the novel, someone is drowned in elastic water, when it self-siphons into his lungs, but the finale of the novel was that one country had decided that it had more highland and it was going to blow up the northern ice caps, raise the water level and take over the world. Fortunately, another country seeded the Arctic Ocean with polyethylene oxide, and so when the explosion happened, the ice bounced back together again and froze. It was total fiction, but it fascinated me. I could not believe that a material could behave this way.

There was no polymer science in Chemistry at 'O' level in those days, so I went to the local library and took out books on polymers. By the time I went to university [the University of Sussex], I knew I wanted to be a polymer scientist.

To this day I still find playing with materials interesting – stretching things, bending things, stroking things or setting light to them. We are surrounded by amazing materials and we take them for granted. If you look at a simple table [points to the desk], there's an incredible structure. The patterns you see are the cross-sections of the structure that builds up year on year. The light woods and dark woods are laid down at different times of the year. Most people don't get a chance to understand these things.

What did you enjoy most about your degree?

Although I picked what I thought was a narrow subject, I soon realised it was broader than chemistry. I not only learned about the chemistry of how you make polymers, but also the material science of their properties, the maths that underpinned the theory of their behaviour, and biology, as polymers are the basis of life. I had broad scientific training. I then did a PhD [sponsored by ICI Plastics] which looked at predicting the lifetimes of polymers with different antioxidants. It was challenging as I had to measure across all sorts of time and temperature scales. I learnt a lot about experimental technique.

Are there any projects that you have been involved in that you are particularly proud of?

There was a period from 1991-93 where I got involved in two phases in the development of a project. In 1991, I was running the corporate research group at Courtaulds. We had bought and combined a number of American companies who made films that were used on home and car windows for solar control. These companies dyed the film with a mixture of dyes to get a range of greys, applied adhesive on one side and laminated another layer on to protect the outer surface. The films were then sold to stick on windows. One of the companies came to the corporate group looking to improve the process for dyeing polyester film. A scientist in the group suggested thermal dye transfer, which was much more effective, in terms of the use of dye, and produced less of an environmental hazard.

The following year I was seconded out to the US and became responsible for implementing the technology that we had developed. So I took it through the next phase, where we did pilot line tests and designed the plant. That was neat – too often in research, you see the beginning of the process but not the end. I like the science, but what I really get a kick out of is reduction to practice. I used to like walking past cars in America knowing that the window film was probably ours. Materials are all about bringing science into the real world and making things work.

What is the aim of Materials UK?

Materials UK is about implementing what the materials community has identified as necessary through the work of the Materials Innovation and Growth Team (Materials IGT), which ran from 2005-6 [see *Materials World* for regular sections on Materials IGT from 2005-6]. It would be a real shame, having accumulated a lot of good ideas, to waste the effort. The overriding purpose is to enable every materials-related organisation or company to be more effective. Materials UK wants to provide a strong voice for UK business, whether to

materials

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Government, international communities or within the community itself. Any materials company or individual can join. The first thing we need to do is broaden the visibility of Materials UK [which currently has the support of companies such as Alcan, Rolls-Royce, Alstom, QinetiQ, Corus, Engineering Employers Federation, Advanced Composites Group and the Welding Institute].

The materials community has always recognised the importance of networking and sharing information among its members. It is amazingly diverse. It's everything from steelmaking, light metals, ceramics, through to carbon fibre reinforced materials, glasses and polymers, with lots more in between. The people who come forward to sit on committees, attend meetings and take action are real enthusiasts. They have a shared interest in materials science. It's a very rewarding community to be part of.

One of the increasing challenges is the issue of recycling and sustainability. We need to understand how to choose materials that have the least environmental impact, and understand the impact of environmental legislation on UK business.

How are materials important to design?

About a year ago, Bernie Rickinson (the Institute's Chief Executive) volunteered me to give a talk at the Royal College of Art [based in London, UK] at the first Materialise [an event bringing the materials and design community together and co-organised by IOM³]. I talked about what I knew – functional design elements [See *Materials World*, December 2005, p24-26]. I had more e-mails about that paper than anything else. It is exciting and fun to sit with designers who ask, 'Why can't you do this?' It makes you think about your materials science – why is aluminium an interesting choice for some things (we were talking about laptop cases) but plastic is better for others? Whether a material feels nice when you touch it does not come into most materials science courses, and yet it is very important to the design community.

What are your tips for graduates entering the materials industry?

Ask questions. If you don't understand something and you don't ask, nobody will explain it to you. Everyone I have worked with has taught me something because I asked the questions. We at the grey end of the community need to spend more time telling our stories, answering questions and encouraging young people. The really great scientists and technologists go on learning.

Good teachers are worth their weight in gold, but they need information, ammunition, ideas and money. For example, the television programme, *Dragon's Den*, is making being an entrepreneur fashionable. Most science and technology on television is either boring or too cutesy to be interesting. That is why Materials UK has just published their Youth Report on the future of materials, targetting schoolchildren aged 11-14 – we need to inspire the next generation of potential materials scientists.

For further information, visit www.matuk.co.uk, or contact David Bott, e-mail: david.bott@matuk.co.uk.

Materials UK round-up

- Materials UK will enlist broad representation from the materials community, working with companies, trade associations and learned societies.
- Working with that broader community, Materials UK will continue the work of the Materials IGT to deliver strategies for essential activities such as optimisation of the UK's R&D base, provision of a validated database of materials property for designers, producers and users, and knowledge transfer to support the development of materials, manufacturing and new applications. A series of working groups focus on – policy and regulation, science and technology, education and skills, materials for energy, and materials in construction.
- With the support of the new body, the UK's materials community will be in a position to respond to new opportunities and challenges, and mobilise high-powered teams quickly to review key issues and identify opportunities for global leads for the UK.
- Materials UK will allow the materials community to provide a coherent view on common policy, regulation and funding strategies to Government. In this way the umbrella body will add strength and persuasiveness to the activities of the organisations that now represent individual sectors.
- The organisation will seek to influence the regional materials strategies of the RDAs, devolved administrations and major funding bodies.
- It will try to create a climate in which the UK is considered to be a good place to carry out materials related business.

Meeting announcements

- The Materials for Energy Working Group of Materials UK is holding a town meeting on 24 November 2006. The workshop on 'Energy Materials – Defining R&D Priorities' will be held at the DTI Conference Centre, 1 Victoria Street, London, UK. Visit the Materials UK website for online registration at www.matuk.co.uk.
- The Science & Technology Working Group seeks to drive forward the science and technology agenda for materials in the UK. A town meeting will be held at the Institute of Materials, Minerals and Mining, 1 Carlton House Terrace, London, on 14 December to discuss future strategy. For further information, contact Jackie Butterfield, e-mail: jackie.butterfield@iom3.org, tel: +44 (0)1302 380906.