

Editorial

This issue of the BCG newsletter should reach you in time to alert you to the Annual General Meeting, followed by an afternoon seminar. AGMs are not notable for inspiring enthusiasm in members but we have over the past few years held them within the framework of some extremely good and lively review-style meetings. They have never been attended in quite the numbers that the content deserves but this year we are grateful to Nicole Grobert for arranging it to be held at Oxford. There will be the added attraction of a buffet lunch at only £10 and the theme of the scientific part of meeting will be “Computational Carbon.”. Don’t worry if this is not your field: Nicole has lined up four very good speakers who will tell us what the current state of the art is and how it is throwing light on the nature of carbon in all its forms. I’m sure that all will find it very interesting and worthwhile attending. Full details are given in the following pages. You will also find the formal notice of the AGM and last year’s AGM minutes.

In the last issue, we showed all the entries of our “Capturing Carbon” competition. This had clearly inspired many artistic flights of fancy as well as some more down to earth but equally fascinating photographs. They are all on our website and the winning entry appeared in RSC News as the background to a feature about the BCG. More recently, RSC members who read Chemistry News diligently will have been intrigued to see pictures of an outdoor show of what most of the general public will have thought was part of the Royal Academy’s Summer Exhibition, installed as it was in the courtyard of Burlington House, outside not only the RA but also the RSC of course. We, of course, will have immediately recognised them as structures of three forms of carbon. They were installed by Dr. Graeme Jones of Keele University and I am pleased to say that he has contributed an article about the installation and what lay behind it.

May I take this opportunity of appealing for contributions to this newsletter. An editor can only use material that he or she has to hand and I have not been exactly deluged with offers of contributions, even though some of the Summer’s edition had its controversial elements. Sadly, no-one has responded. Surely, some of you must have something to say, whether it’s just to sound off about the environment, the state of research on carbon in the UK or just to tell us what you yourself are doing at the moment on carbon. After all, you can publish thoughts and ideas in your newsletter that you might feel reluctant to send to a more formal forum.

There are a couple of announcements of meetings of interest to BCG members, notably for Carbon 2010, which will be held in the USA. A Brian Kelly award will be available for UK and European attendees, details of which are given in the newsletter.

Finally, congratulations to Tony Wickham for his receipt of the first European Carbon Association (ECA) Award for his work in the field of carbon. This reflects very much on Tony’s considerable achievements but is also a great honour for British work in this area as a whole. If he goes on collecting awards at this rate, he’ll have to buy a new sideboard to keep them on.

We give below the notice of the AGM and the Christmas meeting on Computational Carbon. Registration is by means of the website (see bottom of the next page) but in brief the fee will be £10, to include buffet lunch and tea. Travel details can be obtained by reference to the website of the University Department of Materials (also given below) but it should be emphasised that parking in Oxford is always difficult and that taking the park and ride option is to be recommended if coming by car.



Christmas Meeting AGM & Computational Carbon

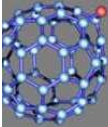
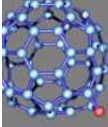
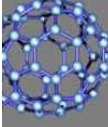
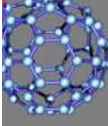
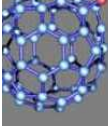
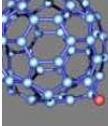
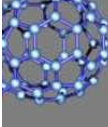
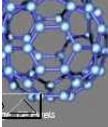
18th December 2009, 1:30pm

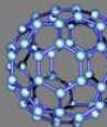
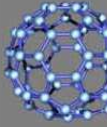
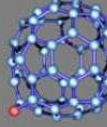
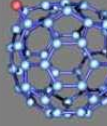
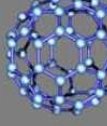
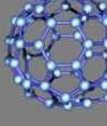
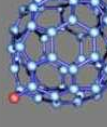
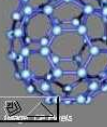
Venue:
Hume Rothery Lecture Theatre
Department of Materials, University of Oxford

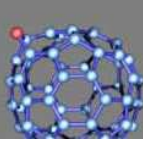
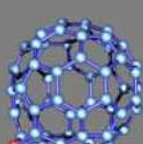
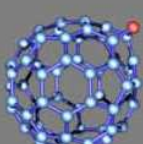
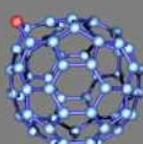
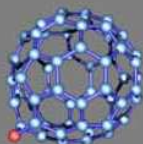
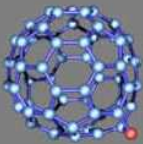
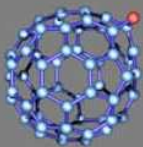
12.30	Buffet Lunch
13.00	AGM for BCG members
13.30	Welcome Dr Gareth Neighbour <i>Chairman of BCG, University of Hull</i> Dr Nicole Grobert <i>Vice-Chairman of BCG, University of Oxford</i>
13.35	Magnetism in sp-Bonded Materials Professor Nicholas Harrison <i>Imperial College London</i>
14.25	Gaussian Approximation Potentials: quantum mechanical accuracy without the electrons Dr Gabor Csanyi <i>University of Cambridge</i>
15.05	Tea & Coffee
15.35	Energy loss spectra from carbon materials - how modelling can help Dr Rebecca Nicholls <i>University of Oxford</i>
16.15	Graphite, neutrons, and the illusion of knowledge: science on trial Professor Malcolm Heggie <i>University of Sussex</i>
16.55	Meeting Close







The British Carbon Group

The British Carbon Group (registered charity 207890) is affiliated to The Royal Society of Chemistry, The Institute of Physics and The Society of Chemical Industry.

Carbon has a broad repertoire of extraordinary physical, mechanical and chemical properties, but has seldom had a starring role in the science world. It has supported metal clusters which perform feats of catalysis, lined fusion reactors, provided electrodes in large scale steel furnaces, enabled lithium ion battery technology, moderated neutrons in fission reactors, provided exceptional 'cutting' tools, ... the list is endless.

In recent times this has changed. The single sheets of graphite could be produced curved by pentagons into cage molecules (fullerenes) or rolled into carbon nanotubes. In the last decade, finite single and double sheets of graphene have been produced. It turns out that the dynamics of charge carriers in mono-layer and bi-layer graphene have extraordinary properties, deriving largely from the fact that they have zero effective mass. The future of carbon materials is bright!

This event is organized by the British Carbon Group which is devoted to the advancement computational aspects of carbon science. The Group organizes one or two International Conferences per year. Once every decade or so the Group is responsible for the organization of the International Carbon Conference, the last of which was held in Aberdeen in 2006. It was the biggest ever such conference to be held in Europe. If you are interested in carbon, become a member today!

To contact the Group and for more information about the Group's activities, please see our website at

<http://www.britishcarbon.org>

Registration:

<http://www.britishcarbon.org>

Travel info:

<http://www.materials.ox.ac.uk/infoandnews/travel.html>



IOP Institute of Physics

RSC Advancing the Chemical Sciences

SCI
where science meets business

Institute *of* Physics

RS•C
ROYAL SOCIETY OF CHEMISTRY

The British Carbon Group

Notice of 2009 Annual General Meeting

Notice is hereby given that the 2009 Annual General Meeting of the British Carbon Group will be held at the start of the Computational Carbon Annual Christmas half day meeting on Friday 18th, December 2009 at 1.30 pm.

The venue is the Hume Rothery Lecture Theatre, Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH.

The business of the Meeting is as follows: -

1. Apologies for Absence
2. Minutes of the previous AGM (Held at The Institute of Physics, London, 16th December 2008).
3. Matters Arising
4. Chairman's Report
5. Treasurer's Report
6. To Receive Notice of the Representatives of the Sponsoring Bodies
7. Election of Officers and committee members.
8. Any Other Business

At the 2009 AGM the Chairman and Vice Chairman must retire and offer themselves for re-election. Nominations for these positions are invited. In addition the positions of two ordinary Committee members fall vacant this year and nominations for these two positions are also invited.

Nominations duly proposed and seconded and with the consent of the nominee, should be received by the Honorary Secretary before 11th December, 2009 at the following address:

Dr. P. C. Minshall
Oldbury Technical Centre,
Oldbury Naite,
South Gloucestershire
BS35 1RQ

e-mail: peter.c.minshall@magnoxnorthsites.com

THE BRITISH CARBON GROUP

MINUTES OF THE 2008 ANNUAL GENERAL MEETING HELD AT THE INSTITUTE OF PHYSICS, PORTLAND PLACE, LONDON, 16th. DECEMBER 2008 AT 12.30 pm

PRESENT: Dr. Gareth Neighbour (Chairman), Dr. J. Fisher (Hon. Secretary) 6 committee members, plus 13 members.

APOLOGIES FOR ABSENCE:

Apologies for absence were received from:

Professor H. Marsh, Dr. A.J. Wickham (Hon. Treasurer), Professor B. McEnaney, Dr. N.Grobert (Vice Chairman), Professor R. Bradley, Professor Sergey Mikhailovsky, Dr. A. Fletcher, Dr. H. Hunter, Dr. C. Eley,

MINUTES OF THE PREVIOUS MEETING

The minutes of the previous AGM, held on the 18th December 2007 at the Institute of Physics, London, were approved as a true record.

ACTIONS AND MATTERS ARISING (not covered in Agenda)

There were no matters arising.

CHAIRMAN'S REPORT (Dr. Gareth Neighbour)

Many thanks to all of you for coming today.

It has been a privilege to occupy the post of Chairman of the past year. I have always tried to remember that we are indeed a charity with the mission to promote carbon science through a variety of activities including education and research. I believe this year we have succeeded in doing this.

I have tabled a more detailed Group Annual Report which is submitted to our sponsoring bodies: the IOP, RSC and SCI. Please feel free to take one away with you.

Firstly, I would like to extend my sincere thanks to my fellow officers and committee members that have supported me over the last year.

This year, Professor Mark Thomas under our rules must stand down, but thankfully he has indicated he is willing to be co-opted back on to the committee. I would like to extend our thanks to him for his service to the BCG and the terrific job he did as Programme Chair of our Carbon 2006 conference during his three year term.

This year also, Dr John Fisher must also stand down under our rules as our secretary after six years dedicated service. He has truly been a rock upon which the BCG committee has rested. He will continue as an active member of the committee as the SCI appointed representative.

This year we have run three meetings. The first is Nanotec'08 at Sussex which has now run for ten years and I would like to congratulate the Nanotec Team of Malcolm, Chris and Nicole for their dedicated and effort in running this terrific and highly successful annual meeting. The second was the "Securing the safe performance of graphite reactor cores" at Nottingham

which attracted over 100 delegates. Last, but not least is the meeting today which I am thankful to you all in attending.

We have also run for the first time a successful “Capturing Carbon” competition with the aim to populate our web site with useful and appealing images of carbon science. I must also take this opportunity in thanking Chris Ewels for looking after our web site. It is indeed much appreciated. I would also like to single out Norman Parkyns for his excellent work in editing our newsletter, a task which is by no means easy collecting the copy!

We continue to celebrate the life of Brian Kelly in the award made for a paper presented at the international carbon conference and this year this went to Dr Hulicova-Jurcakova from the University of Queensland. We also celebrate the life of Professor Ubbelohde through his Memorial Lecture and I am very pleased to see this given today by Professor Steve Tennison.

Last, but not least, I would like to recognize the long service given by Dr Tony Wickham, our Treasurer, to the British Carbon Group and I am very pleased to report this service was recognized by the Royal Society of Chemistry at their Annual Congress this year.

Finally, I should like to thank all the committee, especially the newer members who have given freely of themselves at a demanding time in their careers and injected so much enthusiasm.

May I also take this opportunity to encourage everyone to participate in our Group at meetings, in representing the BCG through other fora and by putting forward yourselves for election to the Committee. The long term success of any group lies with welcoming new blood.

To close, I would like to wish all of us, and BCG in particular, a very merry Christmas and a happy new year and let's hope 2009 is as successful as this year!

TREASURER'S REPORT FOR FINANCIAL/CALENDAR YEAR 2007(Pesented by Dr. G Neighbour)

1. Please accept my sincere apology for absence resulting from a business commitment at The International Atomic Energy Agency in Vienna.
2. Responsibility for financial accounting in this joint group is to with The Royal Society of Chemistry ('the Society'), on behalf of The Institute of Physics and The Society of Chemical Industry.
3. The accounts of the Group are in an extremely healthy state. At the start of this financial year, when I took over, the surplus arising from the international carbon conference at Aberdeen in 2006 had not been placed into an interest-bearing account. This was quickly remedied by adding a significant sum [£20,000 net over the year] to the investment account held on our behalf by the Society which includes the monies of the Brian Kelly Award Fund (which are administered by us but are not Group property. Two redundant NatWest investment accounts were closed, leaving us with a single current account held at the Leeds University Branch of NatWest, and an investment account administered by the Society in Cambridge.

4. Dealing with the Brian Kelly Award fund first, the accrued apportioned interest exceeded the amount of the award (£500) leaving this fund in a healthy position with an accrued balance of £15,037 at the end of the year.
5. The short form of the accounts (black and white) is in the format required by the Society and does not give significant detail. I have therefore supplied in addition a more comprehensive account (colour).
6. The shortened account appears to suggest that more money was paid out in support of meetings and conference than was received. This is actually an illusion which arises because various items for conferences were met outside the accounting period in which the meeting was held or to be held, such as a significant pre-payment made in November 2007 for a conference not held until November 2008 – in order to secure a substantial discount on a conference dinner. In reality, all conferences which have been held have resulted in modest surpluses. Organising committees are to be congratulated on their efficient budgeting.
7. Numerous bursaries to enable students to attend conferences have been made during the year. The maximum individual amount available is generally £200.00 and a report for the Newsletter is a condition of the award.
8. The Group remains registered for VAT on the recommendation of the Treasurer because the annual turnover is close to the VAT threshold and the process of de-registration and re-registration is not simple. The net payment to H.M. Customs and Revenue, representing the difference between VAT due on registration fees etc and that reclaimable on purchases in the year was £ 3126.47.
9. Committee travel remains a relatively expensive item if taken alone: however, as a proportion of the Group turnover it is very reasonable. The committee is very active and is widely spread geographically (between Aberdeen and France) and is considered to be enriched by this geographical diversity of institutions. Committee meetings are generally held in London, and the costs reflect largely the cost of standard-class rail travel.
10. 2007 is the first year in which Group members originating within The Society of Chemical Industry have been appropriately funded by that institution to match the subscription income provided by the IOP and the RSC. We are grateful to the Society of Chemical Industry for recognising the need to modify their systems to provide an equitable solution.
11. The accounts were audited without charge by Dr. E. Ian Mercer, C.Chem, F.R.S.C. of Aberystwyth. Dr. Mercer is the former treasurer and current auditor of the Society's Mid-Wales Local Section, and has been in receipt of all relevant paperwork to enable to reach an independent opinion on the status of the Group account. The Treasurer wishes to thank Dr. Mercer for his work in this capacity. Dr. Mercer has agreed to audit the account for 2008.

Notes on 2008 Accounts

This is not part of the formal treasurer's report to the 2008 AGM, but is added for information

1. Another very successful year is drawing to its end, with two important conferences (NanoteC08 and 'Securing the Safe Performance of Graphite Reactor Cores') returning surpluses. In the latter case a total of £27,000 in sponsorship will have been provided, and the surplus from this meeting will be 'ring-fenced' against a future nuclear-industry-oriented meeting.
2. A number of fraudulent direct debits have been set up on the account during the year (this happened also in 2006). Current banking arrangements cannot prevent

this, but the amounts are recoverable through the Direct Debit Protection Scheme. In reality, these were repaid *twice* and then taken from us again, illustrating some deficiencies in NatWest procedures which were further illustrated by two instances where in-payments of cheques and credit-card payment returns made over the counter in a local branch went astray and were not, initially, properly credited to our account. The treasurer continues to work with an extremely helpful local branch staff member to protect our finances.

3. Just two bursaries have been awarded this year, the committee tending to reject repeat requests from the same research group. Another award was made, following application through the Group, direct from IOP funds.
4. Additional monies will be added to the investment account at the end of the financial year.
5. Anyone sending in a travel expenses claim or other payment claim against the Group, and who will be therefore shortly be in receipt of a cheque payment, is earnestly requested to bank the cheque before 31st December 2008 in order to avoid the need to accrue funding in the accounts for 2009.

A.J. Wickham, C.Chem., F.R.S.C.

ELECTION OF OFFICERS AND COMMITTEE MEMBERS

At this the 2008 AGM the Chairman and Vice Chairman had to stand down and offer themselves for re-election. The present Chairman and Vice Chairman were re-elected unopposed.

Chairman:	Dr. Gareth Neighbour (University of Hull)
Vice Chairman:	Dr. Nicole Grobert (University of Oxford)

In addition The present Honorary Secretary, John Fisher retires after the 2008 AGM.

Dr. Peter Minshall was elected unopposed as Honorary Secretary.

In addition one ordinary committee member position became vacant at the 2008 AGM.

Dr. Mhairi Gass of Superstem, Daresbury Laboratory, was elected unopposed to the committee.

The following were notified as representatives of the sponsoring bodies:

SCI representative	Dr. J. Fisher
RSC representative	Dr. A.J. Wickham
IOP representative	Dr. J. Goss

The meeting was also informed of the committee's intention to co-opt Professor Mark Thomas of The University of Newcastle onto the committee.

Any Other Business

There being no other business previously notified the meeting was closed at 1.00 p.m.

Confirmed as a true record.

Gareth Neighbour (BCG chairman)

JohnFisher (retiring BCG Honorary Secretary)

Carbon Rapture

(Those of you who are RSC members may have had your attention caught by a striking photograph on page 5 of the September issue. For the benefit of our IoP and SCI members, I should say that it represented very large structural models of forms of carbon that had been exhibited outside Burlington House during the Summer Exhibition of the Royal Academy of Arts, the RA being located in Burlington House, right next door to the RSC. As the same space last year was occupied by a large re-working of the minotaur by no less than Damien Hurst, you can see that this was no small honour. The models were put together by Graeme Jones of Keele University and I am most grateful to Dr. Jones for sending me this account of the event. *ndp*)

"Every element says something to someone (something different to each) like the mountain valleys or beaches visited in youth. One must perhaps make an exception for carbon, because it says everything to everyone."

The Primo Levi quote at the top of the British Carbon Group website is a great quote but sadly I guess far from the truth. The reality is that the general public think little of the elements that make up everything around them, would find it hard to define what an element is and probably don't much care.

This year I was given the privilege to exhibit in the courtyard of Burlington house. This is the first time in over 150 years of joint occupancy of the building that any society, other than the Royal Academy of Arts, has mounted an exhibition in the courtyard. Whatever was going to be put in there needed to look good, engage people and be definitively chemical.

At heart I am an organic chemist and so I naturally lean towards and through my work as a science communicator I just know people love molecular models. Put this together with a nice title 'Carbon Rapture' et voila! all you need to do now is to convince the courtyard committee that it is a good idea – and blow me they gave us the thumbs up.

Carbon Rapture consisted of three exhibits a diamond, graphite and buckminsterfullerene. I know you would have liked a carbon filament or nanotube in there but we only had 3 months in which to make the exhibits from scratch.

You all know the structures so I won't bother you with descriptions, if you want them go to <http://www.keele.ac.uk/depts/ch/makeitmolecular/rapture.html>, but I thought you would be more amused to here some of the curiosities that happen when you make molecular structures at a human scale.

First off, installation day was a hoot. The 5.30 start was a bit of a killer, my restricted knowledge of what cranes can do didn't help and I will never forget that Oh my God moment when we opened up the graphite electrode from UKCG. By 10.00 we were still trying to stabilize the graphite with a block of wood nicked from a skip, and

ladies off to the summer exhibition were stopping to look at the models and asking 'who's the artist?' to which I replied 'I am the scientist'. At about 11.30 Sir Harry Kroto turned up and was a little miffed that the diamond looked more glamorous than the buckyball.

Regarding the exhibits themselves, the diamond has what I call the James Bond effect. You know the start of the films, 007 with his gun is in silhouette and the disc of light follows him around until he eventually turns and shoots and the disc turns red, well you get the same disc effect with the diamond. If you stand parallel with a side of the tetrahedron and look through you see disc of seven hexagons at your eye line which you can see straight through to the other side of the model. If you then walk along the side to the other edge this disc follows you, it is an amazing sensation. I have tried to photograph it but my camera skills are not up to it, lots of others tried usually with a loved one on the other side of the model but I guess, judging from the time people took, it was not that straight forward.

The other oddity was caused by the 1 in 20 fall on the courtyard surface. Over the 5 weeks the exhibits were in the courtyard the C60 morphed itself from a football towards a rugby ball, it is still not spherical!

What was remarkable was to see people interacting with some real chemistry. People would walk into the courtyard and actually read the description of the models and then take a tour around them. Can you believe it, in all the time it has been on display not one atom was lost!

After Burlington house the models went down to the British Science Festival and I am now working hard to find new sites for temporary exhibitions, gardens, museums shopping centres, any public sites, if you know of one near you and you think they might be interested in hosting then drop me a line g.r.jones@keele.ac.uk. For your info the joint sponsors of Carbon Rapture are the [Royal Society of Chemistry](#), [EPSRC](#), [Molymod](#), [UK-CG](#), [Complete Fabrication](#), makeitmolecular.com and [Keele University](#), an amazing group who all stepped up to the mark to get the exhibition in.

It was all good fun. I hope some of you got to see it and others may get to see it in the future, if I had known about you at the time I would have sent you all a message. But, let's not forget it was not really there for you it was for the general public and so as I strive to make Levi's quote a reality, I hope that Carbon Rapture has managed to say something to somebody about carbon.

Graeme Jones, University of Keele

(Since writing this, Dr Jones has set up the exhibition in Trentham Gardens.)

There are two photographs of the exhibition. The first shows a general view of the models of the forms of carbon that Dr. Jones and his colleagues set up. The second shows a close -up of the C60 model. (I can't think who the guy standing in front is.)



ECA award For Dr. A. J. Wickham

Dr Anthony J. Wickham is the first recipient of the European Carbon Association's Award in token of his outstanding service to Carbon Science and for his unfailing support of fellow scientists in their pursuit of scientific excellence.

The Award recognises Dr Wickham's uninterrupted service to the Carbon Community for 40 years starting with his long service with the CEGB in 1968 after finishing his degree at Imperial College. He remained with the CEGB for 27 years and in the first three years he completed a PhD on radiation chemistry in CO₂ nuclear coolants and then working on the behaviour of graphite moderators in reactors across the world. He is well known through the world having worked for the IAEA and US and European nuclear authorities. He is also chairman of the IAEA technical committee concerned with nuclear graphite irradiation behaviour and created the INGS series. He has also given unstinting service to the British Carbon Group for longer than anyone can remember – certainly greater than the 20 years that I have known of his service. Indeed, he was instrumental in the formation of the joint group with the Royal Society of Chemistry (RSC), Institute of Physics and Society of Chemical Industry. Since the creation of the group, he has served as both a committee member and in all honorary officer positions. His service has been given unselfishly and with more passion than I have witnessed in any other. He routinely takes the lead in organising our meetings including the highly successful Carbon 2006 meeting in Aberdeen with more than 650 registrations. This alone in my view would have been sufficient service to be recognised for the ECA Award, but I am also aware of his unquestioned support of the RSC through his participation and service to the mid-Wales section of the RSC and the participation in the chemistry in schools annual competition in many roles including the question master. I would go as far as to say that his support for the carbon sciences is truly vocational.

Although Dr Wickham is recognised in his field and publishes widely including recently at Carbon 2009, he was undoubtedly the most excellent candidate to be recognised for 'remarkable service to the carbon community' in that he has never sought reward for enthusing and inspiring others, he is influential in strategically leading areas of carbon science associated with nuclear graphites and carbon waste, and simply put, it is doubtful whether there would be a strong carbon community in the UK and elsewhere without his determination to provide a strong network for others to flourish in a healthy environment for scientific achievement. He is undoubtedly highly respected by all that come across his path. He is an excellent ambassador for Carbon Science and in my view is a very worthy recipient of the Award. As a foot soldier, he would not expect nor seek reward, but to me without people like Dr Wickham, the carbon community would be a poorer place. I wholeheartedly congratulate him on his award.

GB Neighbour, Chair BCG

Brian T Kelly

Brian Kelly was a world authority both on the physics of graphite and on irradiation damage in solids. He was born and educated in Wales and spent most of his career working for the United Kingdom Atomic Energy Authority, UKAEA. One of his major contributions at UKAEA was to the development of specifications for the isotropic graphite required for the graphite core for the British Advanced Gas cooled

Reactors, AGR. Brian's approach, which he carried out brilliantly, was to underpin engineering design data with an understanding of the basic science. For example he related the irradiation-induced dimensional changes in the graphite bricks in the reactor core to the displacement of atoms in the graphite crystal. Brian made many contributions to the basic science of graphite, much of it summarised in his much sought after book '*The Physics of Graphite*', Applied Science Publishers, 1981. In 1981 he also received the Charles E Pettinos Award of the American Carbon Society for '*his many contributions to the theoretical and experimental aspects of the physics of carbon and graphite....*' After his retirement from the UKAEA, Brian was engaged as a consultant by Oak Ridge National Laboratories, USA. During a productive association with ORNL, Brian worked on a number of projects including graphites for high temperature gas-cooled reactors and the mechanisms of irradiation induced creep of graphite. Brian was an engaging person who wore his formidable learning lightly. At conferences he enjoyed vigorous but good-natured discussions on many topics but particularly on the physics of graphite.

B. McEnaney

The Brian Kelly Award 2010

The
British Carbon Group

This prestigious annual award was established in 1996 by the British Carbon Group in memory of Brian Kelly, a leading authority on the physics of graphite to reward excellence in carbon science and technology.

The award is intended as a travel grant for students and early career researchers with up to ten years postdoctoral experience to attend the annual World Carbon Conference. Anyone living or working, at the time of that conference, in the country where the conference is held is **not eligible**. As a consequence, applications will not be accepted from the USA on this occasion.

The award is made upon the basis of an appraisal of THREE documents: (1) the extended abstract or paper as submitted to the C2010 conference, (2) a short CV (with the date of the award of PhD if applicable) and (3) a commentary provided normally by the candidate's supervisor or close colleague. Self-nomination is permitted. The Award Committee of the British Carbon Group will determine the successful applicant.

The closing date for applications for C2010 will strictly be 4pm BST **30th April 2010**. No submissions after this date will be accepted.

The award is currently five hundred pounds sterling (£500) and is presented at the time of the conference with a certificate. It is a condition of the award that the winner attends the conference and presents his or her paper either orally or as a poster.

Applications may be transferred electronically to the Chairman of The British Carbon Group, Dr Gareth Neighbour, at g.b.neighbour@hull.ac.uk or, exceptionally, mailed to him at the following address:

Dr Gareth Neighbour,
Chairman, The British Carbon Group,
Department of Engineering,
University of Hull,
Hull,
HU6 7RX,
United Kingdom.

*The British Carbon Group (registered charity 207890) is affiliated to The Royal Society of Chemistry,
The Institute of Physics and The Society of Chemical Industry.*



Previous Winners:

- 1996: Y. Kawabuchi, Kyushu University, Japan.
- 1997: J. Barbosa-Mota, Inst. Biologia Experimental e Tecnologica, Portugal.
- 1998: B. Fathollahi, University of California, San Diego, USA.
- 1999: No award.
- 2000: J. Klett, Oak Ridge National Laboratory, Tennessee, USA *and* J. Andresen, Penn State University, USA (*two awards*).
- 2001: Z.-X. Ma, Tohoku University, Japan.
- 2002: J. Y. Howe, Oak Ridge National Laboratory, Tennessee, USA *and* M. Guellali, University of Karlsruhe, Germany (*two awards*)
- 2003: No award.
- 2004: Q. H. Yang, Tohoku University, Sendai, Japan.
- 2005: No award.
- 2006: An-hui Lu, Max-Planck-Institut für Kohlenforschung, Germany *and* E. Flahaut, Université Paul Sabatier, Toulouse, France (*two awards*).
- 2007: P. Adelhelm, Max-Planck-Institute of Colloids and Interfaces, Germany.
- 2008: D. Hulicova-Jurcakova, ARC Centre of Excellence for Functional Nanomaterials, University of Queensland, Australia.
- 2009: G. Haffenden, Department of Chemistry, University of Sussex, Brighton, UK



2009 winner, Gemma Haffenden, with committee chairman Gareth Neighbour

Professor A. R. Ubbelohde FRS

Prof. Ubbelohde had a wide interest over a range of topics in physics and chemistry but is chiefly remembered for his outstanding work on carbon, especially graphite and its intercalation compounds. He worked on this over many years, initially at Queen's University, Belfast and then at Imperial College, London. He then pioneered the production of Highly Oriented Pyrolytic Graphite (HOPG) in the Carbon Research laboratory at IC, where the properties of this material were investigated extensively and samples sent to many other laboratories.

He was recognised internationally for this work and was also one of the founders, and Chairman for many years, of the Industrial Carbon and Graphite Group of the Society of Chemical Industry, which merged with the Carbon Group of the Royal Society of Chemistry and the Institute of Physics to form the present British Carbon Group (BCG). The quadrennial London Conferences on Carbon and Graphite that he initiated became major international events and were fore-runners of the present annual international Carbon Conferences. He was a large man, in all senses, with an enormous range of interests outside physical chemistry. He was an inspirational teacher and supervisor, who left a legacy of many generations of his research students and associates.

In the photograph, taken at one of the Buffalo international conferences, he appears on the right of the organiser, Prof. S. Mrosowski, another major figure in carbon researcher and a great friend.



Third A.R.Ubbelohde lecture

Initiated at the 2006 Carbon Conference in Aberdeen, the Ubbelohde Memorial Lectures were established in memory of Professor A. R. Ubbelohde from Imperial College London, in recognition of his enormous impact on the field of carbon science. This year's Ubbelohde lecture was given at the NanoteC'09 Conference held in Brussels, from 26-29th August, by Professor Mildred S. Dresselhaus, on the subject of 'Developments in optical spectroscopy of carbon nanomaterials'. Millie gave an excellent review of the breakthroughs made in Raman spectroscopy in carbon, notably carbon nanotubes, and showed that the field is still one of rapid development with discussion of many intriguing new results emerging from spectroscopy of graphene. She was delighted to receive the award during the conference banquet and commented in her acceptance speech that it was a most appropriate award, since Professor Ubbelohde was a key figure in her choice to study carbon. Early into her career at the start of the sixties she decided to try a new direction for her spectroscopic research, and one idea suggested was that of carbon. Professor Ubbelohde had just developed the synthesis method for highly oriented pyrolytic graphite (HOPG), and it was thanks to him she was able to obtain her first high purity samples. With these, in 1961 she was able to make the first magneto-optical measurements of the graphite energy bands at several regions of the Brillouin zone, allowing

derivation of the band parameters for the electronic structure of graphite. The rest, as they say, is history!

Chris Ewels

NanoteC09 Brussels Belgium 26th -29th August 2009

NanoteC09 was the first conference I attended that was organised by the British Carbon Group and it exceeded my expectation. The organisation was superb with everything timely arranged with no delays between talks and breaks or meals. The location was very convenient and easy to trace from someone who had not been in Brussels before. The evening off was very well planned and we managed to visit several places within Brussels for example Manniken Pis and the atomium. The conference dinner was well prepared and truly enjoyable after the 3 long days of lectures.

In relation to the presentations and posters, the quality was very broad for the different branches within carbon nanomaterials community. Ranging from basic fundamental understanding of the new carbon nanoforms to applications whereby a company also presented some of the products they have out in the market which contain carbon nanotubes for example, polymer-carbon nanotube products for electronic packaging with excellent magnetic shielding properties.

The introductory lecture was given by Mildred Dersselhaus (MIT) who is one of the pioneers in the Raman spectroscopy of carbon nanomaterials. (*The 3rd Ubbelohde lecture-see Chris Ewels' account above. Ed*). Her presence at the conference was heavily felt as she engaged every speaker from a deep breadth of knowledge that spans almost 50 years in carbon materials. This time she spent more time talking about Raman spectroscopy of grapheme, which is receiving a lot of attention in the carbon community. I had a chance to show Mildred my poster titled 'Aligned carbon nanotubes-ceramic composites' which focused on thermal properties to the composites. We had a very fruitful discussion whereby we agreed that applications of these new materials will play a key role in the future of electronics. For the posters, I found that the poster titled 'Standardising carbon nanoforms nomenclature' was important in summarising all the different names that have been used for the several nanoforms. A list of suggested standard names was suggested. For the carbon and related materials, I thought it was important for the community to reach an agreement on the names of these materials.

I did meet other researchers during the poster sessions. Of particular interest was a contact from Cambridge University (UK) who has agreed to provide me the materials for my research and to develop collaboration. I also got very good advice from an industrial perspective on another possible applications of the materials I am fabricating. I have already discussed this with my supervisors and we are looking to pursue this area in details. For the specific oral sessions, the opening session was extremely well done and the talks were well delivered. The other sessions that I found to be extremely useful were the health and applications and the composite session because it touched on my research area.

As a whole, the conference was a success from my point of view and I will be looking forward to attending the next NanoteC conference at Oxford in September 2010 with a view of learning more on the research going on in the carbon community and developing more contacts.

Geoffrey Otieno University of Oxford



Ali Rinaldi (far left) from Fritz-Haber Institute, Germany and Geoffrey Otieno (far right) from University of Oxford (UK) with one of the Students from Brussels (middle) at the atomium

Report on NanoteC09 conference Brussels 26/8/09-29/8/09

I am very pleased to have attended the NanoteC09 conference: Nanotechnology in carbon and related Materials and I am very thankful for the travel grant which the BCG offered.

The presentations at the conference provided direct links to my own research, based on understanding the spin dynamics of carbon peapods, as well as providing information about new carbon materials like graphene. The most impressive talk at the conference was by Mildred Dresselhaus, a leader in carbon nanotechnology research, who gave a really impressive talk on “Recent development in the spectroscopy of carbon in nanomaterials”. The talk focused on the spectroscopy of double-walled nanotubes and highlighted the key features of the materials as determined from spectroscopy.

The poster I presented, entitled “Purification methods for removal of catalyst particles from single walled nanotubes” received much attention from the other scientists. The poster explained the current production methods available to produce single walled nanotubes, and the post production treatments employed to remove impurities, such as catalyst particles, amorphous and graphitic carbon. I explained the results of my analysis of the various purification methods and described how the single walled nanotubes will be utilized for my research. Through discussions with other scientists about my work, I have many new ideas to implement, in particular in modify the parameters of the laser ablation production of the single walled carbon nanotubes to improve the purity of the material.

The conference was organised very effectively, with efficient grouping of the presentations and the schedule of the conference allowed for many discussions to be held with other delegates. The organizing committee scheduled a discussion group, concerning the role of women in science and held a poster competition, which added to the success of the conference.

Attending the NanoteC09 conference was a very good experience, as it allowed my research to be presented to other scientists in the field. The conference provided an ideal platform for discussion about my work with other scientists, yielding some fruitful ideas, which I am eager to implement into my experimental research. I greatly enjoyed the opportunity to meet some of the leaders in carbon based nanotechnology research and learn about new areas of research. I look forward to attending the next NanoteC conference.

Mujtaba Zaka, DPhil Student – Department of Materials, University of Oxford

Forthcoming meetings

Call for Papers

Abstract submission is now open for **CARBON 2010**, The Annual World Conference on Carbon, from July 11th to 16th, 2010 in Clemson, SC, USA. This international conference will highlight cutting-edge research on all forms of **carbon**, ranging from the Nano to Macro scales. The latest findings from the carbon community, including leading industrial and academic experts, will be presented in the form of oral and poster presentations. The technical program will address (but is not limited to):

Fundamentals

Graphenes, Nanotubes and Fullerenes
Precursor Synthesis and Characterization
Conversion Processes
Microstructure and Properties
Molecular Modeling
Novel Experimental Measurements

Applications

Electronics and Sensors
Fibers and Composites
Biology and Medicine
Environment and Safety
Energy Storage and Generation
Other Novel Uses

ONLINE ABSTRACT SUBMISSION AT <http://www.carbon2010.org>
DEADLINE FOR SHORT ABSTRACT SUBMISSION: DECEMBER 18, 2009

All submitted abstracts will be reviewed on the basis of scientific merit, novelty, or practical application by the Technical Program Committee.

A detailed brochure describing the venue, travel arrangements, and registration fees for the conference is available at our website. We look forward to your participation in this exciting conference.

On beautiful Lake Hartwell and conveniently located between Atlanta, GA and Charlotte, NC, the Conference Center and Inn at Clemson University is an ideal venue for Carbon 2010, with excellent facilities for lectures, oral communication and posters. In addition, a wide variety of inviting area, both inside and out, are available for small-group discussions. Along with inexpensive accommodation options to increase student participation, this setting should lead to a highly productive meeting.

Because of the exceptional generosity of our sponsors, we are able to offer the following registration fees:

Early Registration for Professionals - \$775
Early Registration for Students - \$375
(Due by April 30, 2010)

For information on abstract submission, accommodations and travel, please visit our website at www.carbon2010.org.

Mark C. Thies (mcths@clemson.edu)
Carbon 2010

Conference Chair for

Amod A. Ogale (ogale@clemson.edu)

Technical Chair

**CONFERENCE ANNOUNCEMENT AND CALL FOR PAPERS FOR THE
COAL RESEARCH FORUM'S BIENNIAL "8th EUROPEAN CONFERENCE
ON COAL RESEARCH AND ITS APPLICATIONS" TO BE HELD AT THE
UNIVERSITY OF LEEDS ON 6th-8th SEPTEMBER 2010.**

Dear Colleague,

The Coal Research Forum is pleased to announce the issue of the Conference Announcement and Call for Papers for the "8th European Conference on Coal Research and its Applications" to be held at the University of Leeds on 6th-8th September 2010. For further details, please see the announcement below and the conference website, www.eccria.org

Best regards,

Dr. David J.A.McCaffrey.
Conference Finance Officer.
Secretary of the Coal Research Forum.

**8TH EUROPEAN CONFERENCE ON COAL RESEARCH AND ITS
APPLICATIONS: ECCRIA 8**

www.eccria.org

Organised by the Coal Research Forum

<http://www.coalresearchforum.org>

Building on the success of the previous ECCRIA conferences, the eighth meeting is to be held at the University of Leeds. Situated in the North of England on the edge of the Yorkshire Dales, Leeds grew to become one of the largest cities in the UK following the boom of the industrial revolution and today, whilst retaining a rich industrial heritage Leeds can also be regarded as a cultural centre and the financial capital of the North. It is the only English city outside London with its own opera house, repertory theatre, and ballet companies and Leeds Art Gallery has one of the UK's best collections of contemporary British art. The city is also home to the national collection of arms and armour at the Royal Armouries. Leeds is also known as a favoured location for shoppers and with five miles of shopping streets and one of the country's largest pedestrianised zones it's easy to see why. The city also has an excellent nightlife scene, with many restaurants and independent bars, and is widely regarded as one of the UK's best cities for dining out. This bustling and vibrant city provides an excellent base for the conference and a showcase for the North of England, it is hoped that delegates from outside the UK continue to support the event and thoroughly enjoy their stay in Leeds.

SCOPE AND PURPOSE

The purpose of this conference is to bring together researchers in universities with participants from industry who also carry out research or are interested in the application of the research in industry. Papers are invited which describe applications in coal utilisation and preparation with particular reference to the

following areas: ***improving efficiency and reducing emissions in conventional power generation, gasification, fluidised bed technology, CO₂ removal and storage technology, advanced power generation, modelling, sensors, instrumentation and control, emissions issues - including mercury, VOC's and fine particulates, co-firing of coal, particularly with biomass and wastes, carbonisation and other metallurgical uses, coal preparation and handling and other coal conversion processes.*** Research students are also strongly encouraged to submit papers, attend and give presentations and there will be a reduced fee for students.

CALL FOR PAPERS AND PRELIMINARY REGISTRATION

Prospective authors are asked to make a preliminary registration, then submit one or more abstracts at the conference website www.eccria.org by 29th January 2010. Abstracts MUST be submitted via the website. For papers accepted, one author must present the paper at the conference either as an oral presentation or as a poster.

PROCEEDINGS

All authors of accepted papers are invited to submit, by 30th September 2010, a full paper for possible inclusion in a Special Issue of FUEL. The papers submitted should be prepared in accordance with the instructions to authors and MUST be submitted electronically through <http://ees.elsevier.com/jfue>. Authors should clearly indicate that the paper is for the 8th ECCRIA Special Issue. All full papers will be subject to the normal refereeing requirements of FUEL.

FURTHER INFORMATION

Further information concerning the conference will be posted on the About Event page on the conference website.

New evidence for toxic effects of inhaled nanotubes

(This item appeared in the monthly RSC electronic news sheet, Grapevine no.89, and I'm sure is of general interest to all working on carbon. It seems to me that we are being hyper-cautious in dealing with possible health effects like this but one supposes that this is the right side to err on. Chris Ewels has already written on this topic and although it seems that at present there is no great cause for concern, we should keep an eye on it.)

25 October 2009

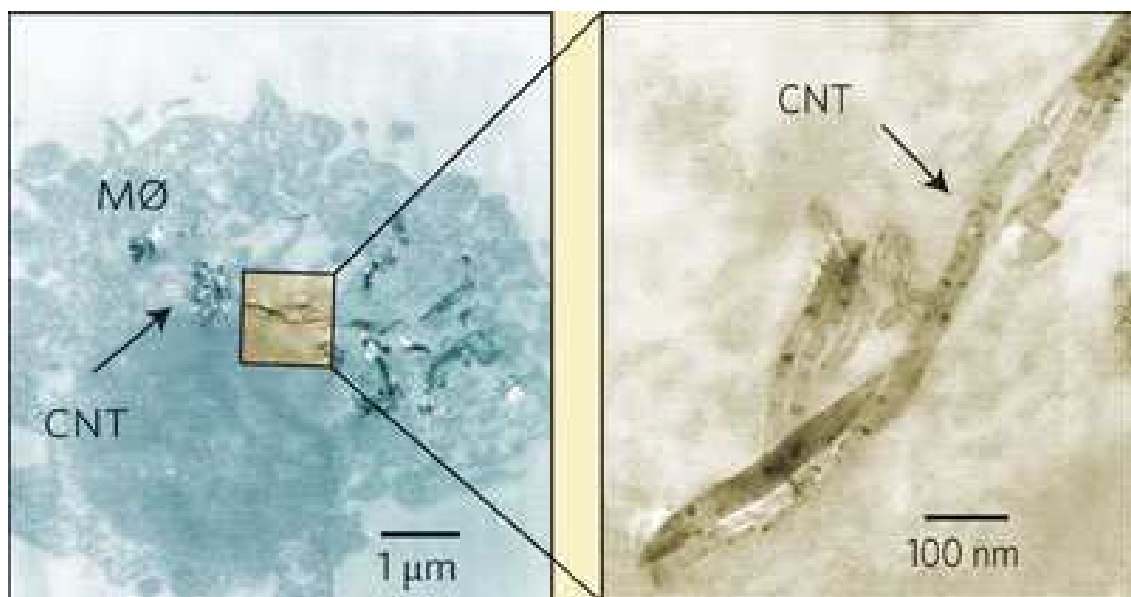
Further evidence for the asbestos-like effects of carbon nanotubes has emerged from a new study in mice. The study shows for the first time that the tubes reach the outer lining of the lung when inhaled - as asbestos does. But researchers say the results should be interpreted with caution.

Carbon nanotubes, like asbestos, have high aspect ratios; in other words, they are long and thin, meaning they have the potential to get stuck when trying to cross the two layered membrane - the pleura - separating the lung from the chest wall. In the case of asbestos, fibres can dwell in this area, causing lung disease and mesothelioma, a type of slow-growing cancer.

'We're not saying that carbon nanotubes are going to be like asbestos. We don't know yet,' says James Bonner of North Carolina State University in the US, who led the research. 'There's no evidence of cancer. The major finding is that we're saying that nanotubes get to the site where mesothelioma would occur, but we don't have the information to say that it does occur.'

Real world risks

Last year, concerns were raised for the safety of those working with nanotubes when a paper published in *Nature Nanotechnology* concluded that nanotubes could damage lung tissue if injected into the abdomen of mice.¹ The study by Bonner and colleagues now provides an insight into potential effects of exposure in the 'real world' by examining what happens when the tubes are inhaled.²



TEM image of carbon nanotubes caught in an immune cell below the pleura (image on right shows detail)

© Nature Nanotechnology

The timescale (14 weeks) of Bonner's experiment was not long enough to test whether inhaled nanotubes cause mesothelioma, but the team did see damage in the form of fibrosis - scarring of the pleura - which is also seen with asbestos. Mice that inhaled multi-walled carbon nanotubes developed fibrosis after around two weeks, with the nanotubes accumulating in immune cells in the region just below the pleura. By comparison, mice inhaling carbon black

nanoparticles, which do not have the crucial high aspect ratio, did not develop fibrosis.

Ken Donaldson of the University of Edinburgh, one of the authors of the 2008 paper, stresses the importance of distinguishing between different types of nanotubes. 'My guess would be that the smallest ones are the least likely to cause much in the way of disease and that the longest ones would be most likely to cause disease,' he says. 'We're not in any position to be able to say this study has generic significance for all other nanotubes, because they come in different lengths, compositions and contaminants.'

Bonner agrees, pointing out that the toxic effects could even be related to the nickel catalysts left over from nanotube growth - other manufacturing processes use different catalysts. He says further studies comparing the effects of nanotubes from different sources, of different sizes and at lower doses are required.

'This research contributes to the emerging evidence base on the inhalation toxicology of high aspect ratio nanoparticles,' says Steve Hankin, a toxicologist with SAFENANO at the Institute of Occupational Medicine. Crucially, he notes, the link between toxicology and the risk posed by any substance is exposure - without exposure, the risk can be substantially minimised or even eliminated.

Hayley Birch

References

1. C A Poland *et al*, *Nature Nanotechnology*, 2008, **3**, 423
(DOI: 10.1038/nnano.2008.111)
2. J P Ryman-Rasmussen *et al*, *Nature Nanotechnology*, 2009, DOI:
10.1038/NNANO.2009.305