

Curriculum Vitae

CLAIRE J. CARMALT

1. Personal Details

Name: Claire J. Carmalt Date of birth: 15th April 1971
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Present appointment: Professor in Inorganic Chemistry; Head of the Department of Chemistry
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2. Education / Qualifications

Dates	Detail of degree	Institution
Oct 1989 – July 1992	B.Sc. in Chemistry (1 st class honours)	University of Newcastle upon Tyne
Oct 1992 – May 1995	Ph.D. "Synthetic Studies Involving Elements of Groups 13 and 15"	University of Newcastle upon Tyne

3. Professional History

Dates	Detail of position held	Institution
Jun 1995 – Aug 97	PDRA with Professor A. H. Cowley, FRS	University of Texas at Austin, USA
Oct 1997 – Sept 2001	Royal Society Dorothy Hodgkin Fellowship	University College London
Oct 2001 – Sept 2009	Lecturer, Senior Lecturer (2002), Reader (2004)	University College London
Oct 2009 –	Professor in Inorganic Chemistry	University College London

4. Awards / Prizes

1996 – 1997 Royal Society Dorothy Hodgkin Fellowship
2001 Royal Society of Chemistry 2000 Meldola Medal and Prize awarded.
2019 Royal Society of Chemistry 2019 Applied Inorganic Chemistry Prize awarded.

5. Evidence of Esteem / Appointments

1989 – Member of the Royal Society of Chemistry (F.R.S.C., C.Chem.).
1994 – Member of the American Chemical Society.
1997 – Peer reviewer for national and international journals (e.g. *Inorg. Chem.*, *Chem. Commun.*, *Chemistry of Materials* etc).
2001 – Internal and External examiner on PhD theses (including Imperial College, University of Nottingham, University of Bristol, University of Strathclyde, University of Manchester, University of Bath, University of Oxford).
2003 – Member of the EPSRC peer review college and referee EPSRC proposals.
2005 – 2008 Member of Dalton Council.
2004 – 2010 Secretary of the Royal Society of Chemistry Main Group Interest Group.
2008 Member of *Dalton Transactions* Advisory Board.
2007 – 2008 Appointed Convener of the Main Group Symposium for IUPAC 2009.
2013 Member of the EPSRC panel "Defining A Strategy For UK Materials Science".
2014 Chair of the inorganic and materials chemistry panel for the Research Council, Academy of Finland.
2014 – Advisor to the Royal Society's Equality and Diversity Advisory Network.
2014 – Royal Society of Chemistry and Royal Society Mentor to new academics.
2015 – Associate Editor for *Royal Society Open Science*.
2015 – 2018 External Examiner for undergraduate taught Courses in Inorganic Chemistry, University of Warwick.
2016 Outer International Assessment Board member for the Government of Ireland Postdoctoral Fellowship Scheme.
2017 UK Jury member for the Blavatnik Awards for Younger Scientists.
2018 Scientific committee for the EuroCVD 22-Baltic ALD 16 Conference.
2018 – External Examiner for undergraduate taught Courses in Inorganic Chemistry, University of Strathclyde.
2019 Chair of the Ramsay Memorial Fellowship Panel.

6. Internal Appointments / Committees

2003 – 2010 Departmental Study Abroad Tutor, UCL.
2008 – 2010 Departmental Graduate Tutor, UCL
2010 – 2016 Head of Inorganic & Materials Section, UCL
2010 Member of Management Working Group, Department of Chemistry
2012 – 2013 Member of the Internationalisation Working Group, UCL.
2012 – Member of the departmental Athena Swan Team.
2013 Member of the Research Committee for the REF submission.
2014 – Member of the MAPS Faculty Leadership Team.
2014 – 2016 Chair of the MAPS Faculty Education Committee.

7. Teaching / Supervision / Enabling

I have taught a range of different courses during my >20 years at UCL and currently lecture on 2 courses CHEM0030 (Organometallics) and CHEM0050 (Atomic Structure). I have previously also taught on CHEM3141 "Inorganic Rings and Chains";

CHEM3101 "Lanthanides and Actinides"; CHEM1101 "Chemistry of Hydrogen"; B1G1 "Chlorine in Household Bleach"; B29 "Overview of the Materials World"; B111 "Superconductivity"; CHEM1101 "Boron-Oxygen and Boron-Hydrogen Chemistry" and CHEM1101 "Solid State". I have also provided tutorials, been course organiser for laboratory classes and demonstrated in the undergraduate laboratory.

I have an active research group so provide supervision to PDRAs and PhD students. I have graduated >35 students from my research group, all completing on time. I have been involved in or led the following:

- *As Head of Department (2016–)* I am responsible for the organisation and general conduct of the Department. I oversee performance management and appraisals, financial procedures, formulate and monitor the academic planning, development and performance of the Department (including planning for REF etc.) and I prepare a Departmental Strategic Plan.
- *As Vice Dean (Education), MAPS Faculty (2014–2016)* I provided leadership for the development of pedagogy within the Faculty working closely with the Faculty Tutor. I led the development of the Faculty's Teaching & Learning strategy, incorporating relevant aspects of institutional strategy. Key priorities were enhancing the student experience and engaging the academic community in research-based education. The "Meet Your Professor" activity was developed and implemented in most departments in the faculty. I was also responsible for reviewing the existing portfolio of taught programmes and establishing new programmes in conjunction with the Dean and Faculty Tutor. I was also on the Connected Curriculum Steering Group and the Student Experience Forum both of which are key university strategic goals and align with UCL2034.
- *As Head of Inorganic & Materials Section (2010–2016)* I managed the teaching within the section (which includes 15 lecture courses, 8 laboratory courses, 1st year workshops, 1st and 2nd year tutorials, literature projects, research projects, final year project panel etc.), overseeing the workload and ensuring everyone where possible has a balanced teaching load and contributes to lecturing, tutorials and laboratory classes. The quality of teaching is discussed with individuals within the section regularly and more formally in appraisals. I led a review of teaching within the inorganic section since it was apparent that there were degrees of overlap of content. This included a review of the inorganic curriculum to ensure all key areas are covered and the best teaching is being provided to our students. We also looked at ways of incorporating computational research into teaching.
- *As Departmental Graduate Tutor (2008–2011)* I made significant changes to enhance the supervision and training including developing a new method of assessment for the MPhil to PhD transfer involving the preparation of a transfer report, an oral presentation and a short viva. Thesis submission rates improved to from 70% to >90% rapidly and are now ~100%. I also developed a UCL "Moodle" site for graduate students within the chemistry department.
- I proposed and developed a new degree "Chemistry (International Programme)" which was approved by the Faculty Teaching Committee in 2005. The degree allows students to spend the 3rd year of their degree abroad (e.g. USA, Canada).

8. Grants

Total research income (1997 – 2017) = £11m from EPSRC, InnovateUK, BBSRC, Pilkington NSG, AzkoNobel (AN), Applied Materials, SAFC Hitech, Altro, ACAL Energy Ltd, Johnson Matthey, Tioxide, Bio-Nanoconsulting (BNC).

Current active grants: £3.3m as PI from EPSRC, InnovateUK, NSG, AN, BBSRC, Novartis, BNC, LAM Research; **£1.07m** as Co-I (EPSRC).

9. Research / Publications

Research in my group is heavily funded by industry (5 PhD students, innovateUK, KTP etc) and currently involves development of materials and routes towards a number of industrial applications involving crystal growth, transparent conducting oxides (TCOs) and superhydrophobic (SH) paints. I am leading 4 industrial projects, one involves a large consortium EPSRC (£2.3m) and EPSRC D2U (£100K) grant with UCL, Loughborough University and 8 companies. In this project we are developing scale up of aerosol assisted chemical vapour deposition (AACVD) with NSG and inkjet printing to create new and efficient ways to produce TCOs. Commercial and economic benefits will be achieved through developments in processing methods towards upscale manufacture of these alternative TCOs and replacing unsustainable elements with more earth abundant elements. A patent has been published with NSG on TCOs in 2016. In the area of SH materials, I lead a project with AzkoNobel developing smart decorative paints via an innovateUK grant and a KTP with Altro where trials are in progress for self-cleaning non-slip floors which incorporates our SH technology. The development of robust SH paints led to a huge amount of media interest with features on >120 websites and interviews for newspapers/radio/TV. A patent which incorporates our SH technology "Composite particle, coating and coated articles" has been published which also includes super-slippery surfaces where oil, ketchup, etc all fail to stick. In addition, Syngenta are funding a project to investigate the applicability of a crystalline sponge method to cover trace level structural problems encountered in crop protection R&D and based on my previous developments of single-source CVD precursors Lam Research in Singapore are funding a project for the development of AACVD routes to tungsten carbonitride. Recently I have given invited talks at many companies (Syngenta, NSG, TWI, AM, AN) and conferences (ACS, EuroCVD, AGICHEM, EuCheMS). Seven invited reviews published in the last 7 years including a *Chem. Soc. Rev.* and *Dalton Perspective* (160 citations) on AACVD and 4 patents have been published and 280 publications (*h-index* 45; 7313 citations) in total. Recent publications in *Science* (IF 37.205), *Angew. Chem.* (IF 12.102), *Chem. Sci.* (IF 9.063).

Selected publications:

1. *Robust self-cleaning surfaces that function when exposed to either air or oil.* Y. Lu, S. Sathasivam, J. L. Long, C. R. Crick, C. J. Carmalt, I. P. Parkin, *Science*, 2015, **347**, 1132 (>530 citations).
2. *Solution Processing Route to Multifunctional Titania Thin Films: Highly Conductive and Photocatalytically Active Nb:TiO₂.* D. S. Bhachu, S. Sathasivam, G. Sankar, D. O. Scanlon, G. Cibir, C. J. Carmalt, I. P. Parkin, G. W. Watson, S. M. Bawaked, A. Y. Obaid, S. Al-Thabaiti, S. N. Basahel, *Adv. Funct. Mat.*, 2014, **24**, 5075-5085 (>70 citations).
3. *Scalable route to CH₃NH₃PbI₃ perovskite thin films by aerosol assisted chemical vapour deposition.* D. S. Bhachu, D. O. Scanlon, E. J. Saban, H. Bronstein, I. P. Parkin, C. J. Carmalt, R. G. Palgrave, *J. Mater. Chem. A*, 2015, **3**, 9071-9073 (>50 citations).
4. *Bismuth oxyhalides: synthesis, structure and photoelectrochemical activity.* D. S. Bhachu, S. J. A. Moniz, S. Sathasivam, D.O. Scanlon, A. Walsh, S. M. Bawaked, M. Mokhtar, A. Y. Obaid, I. P. Parkin, C. J. Carmalt, *Chem. Sci.*, 2016, **7**, 4832 (>89 citations).
5. *The crystalline sponge method: A systematic study of the reproducibility of simple aromatic molecule encapsulation.* L. M. Hayes, C. E. Knapp, K. Y. Nathoo, N. J. Press, D. A. Tocher, C. J. Carmalt, *Cryst. Growth. Design*, 2016, **16**, 3465 (>20 citations).
6. *Solution based CVD of main group materials.* C. E. Knapp, C. J. Carmalt, 2016, **45**, 1036-1064 (>57 citations).
7. *A nanojunction polymer photoelectrode for efficient charge transport and separation.* Q. Ruan, W. Luo, J. Xie, Y. Wang, X. Liu, Z. Bai, C. J. Carmalt, J. Tang, *Angew. Chem. Int. Ed. Eng.*, 2017, **56**, 8221 (>37 citations).
8. *Transforming a simple commercial glue into highly robust superhydrophobic surfaces via aerosol-assisted chemical vapor deposition.* A. Zhuang, R. Liao, Y. Lu, S. C. Dixon, A. Jiamprasertboon, F. Chen, S. Sathasivam, I. P. Parkin, C. J. Carmalt, *ACS applied materials & interfaces*, 2017, **9**, 42327-42335 (>10 citations).
9. *Phosphorus doped SnO₂ thin films for transparent conducting oxide applications.* M. J. Powell, B. A. D. Williamson, S. -Y. Baek, J. Manzi, D. B. Potter, D. O; Scanlon, C. J. Carmalt, *Chem. Sci*, 2018, **9**, 7988.
10. *Photocatalytic and electrically conductive transparent Cl-doped ZnO thin films via aerosol-assisted chemical vapour deposition.* A. Jiamprasertboon, M. J Powell, S. C. Dixon, R. Quesada-Cabrera, A. M. Alotaibi, Y. Lu, A. Zhuang, S. Sathasivam, T. Siritanon, I. P. Parkin, C. J. Carmalt, *J. Mater. Chem. A*, 2018, **6**, 12682-12692.