

Curriculum Vitae

CLAIRE J. CARMALT

1. Personal Details

Name: Claire J. Carmalt
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Present appointment: Professor in Inorganic Chemistry; Head of the Department of Chemistry
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2. Education / Qualifications

<u>Dates</u>	<u>Detail of degree</u>	<u>Institution</u>
1989 – 1992	B.Sc. in Chemistry (1 st class honours)	University of Newcastle upon Tyne
1992 – 1995	Ph.D. "Synthetic Studies Involving Elements of Groups 13 and 14"	University of Newcastle upon Tyne

3. Professional History

<u>Dates</u>	<u>Detail of position held</u>	<u>Institution</u>
1995 – 1997	PDRA with Professor A. H. Cowley, FRS	University of Texas at Austin, USA
1997 – 2001	Royal Society Dorothy Hodgkin Fellowship	University College London
2001 – 2009	Lecturer, Senior Lecturer (2002), Reader (2004)	University College London
2009 –	Professor in Inorganic Chemistry	University College London
2016 –	Head of Department, 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.
2021 UCL One Award – Leadership Award for Outstanding Contribution

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.*, *Nat. Commun.*, *Chemistry of Materials* etc).
2001 – Internal and External examiner on PhD theses (including IC, Oxford, Nottingham, Bristol, Bath, Strathclyde).
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.
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.
2015 – 2019 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 – 2019 UK Jury member for the Blavatnik Awards for Younger Scientists.
2018 – Scientific committee for the EuroCVD 22-Baltic ALD 16 Conference.
2018 – 2022 External Examiner for undergraduate taught Courses in Inorganic Chemistry, University of Strathclyde.
2019 – 2021 Chair of the Ramsay Memorial Fellowship Panel.
2019 – 2021 Ramsay Trustee.
2021 – Member of the HCUK Standing Committee
2021 – Associate Editor of *Crystal Growth & Design*.
2023 – External Examiner for undergraduate taught Courses in Inorganic Chemistry, University of Nottingham.

6. Internal Appointments / Committees

2008 – 2010 Departmental Graduate Tutor, UCL
2010 – 2016 Head of Inorganic & Materials Section, UCL
2010 – Member / Chair of Management Working Group, Department of Chemistry
2012 – 2013 Member of the Internationalisation Working Group, UCL.
2012 – 2023 Member of the Equality, Diversity & Inclusion Committee.
2014 – 2016 Vice Dean (Education), Mathematical & Physical Sciences Faculty.
2014 – 2016 Chair of the MAPS Faculty Education Committee.
2016 – Head of Department of Chemistry, UCL.

7. Teaching / Supervision / Enabling

I have taught a range of different courses during my 26 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"; 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 and I have graduated >35 students from my research group, all completing on time. As *Head of Department* I am responsible for the organisation and general conduct of the Department. I oversee performance management, appraisals, financial procedures, formulate and monitor the academic planning, development and performance of the Department (including planning for REF) and I prepare a Departmental Strategic Plan.

8. Grants

Total research income (1997 – 2023) = ~£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: from EPSRC, NSG, Altro.

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 >300 publications (*h-index* 56; 11538 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.
2. *Aerosol-assisted delivery of precursors for chemical vapour deposition: expanding the scope of CVD for materials fabrication.* P. Marchand, I. A. Hassan, I. P. Parkin, C. J. Carmalt, *Dalton Trans* 2013, 42, 9406.
3. *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, 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.
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, I. P. Parkin, C. J. Carmalt, *Chem. Sci.*, 2016, **7**, 4832.
5. *Solution based CVD of main group materials.* C. E. Knapp, C. J. Carmalt, 2016, **45**, 1036-1064.
6. *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.
7. *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.
8. *Slippery Liquid Infused Porous TiO₂/SnO₂ Nanocomposite Thin Films via Aerosol Assisted Chemical Vapor Deposition with Anti-Icing and Fog Retardant Properties.* F. L. Heale, I. P. Parkin, C. J. Carmalt, *ACS Applied Materials & Interfaces*, 2019, **11**, 41804.
9. *Resonant doping for high mobility transparent conductors: the case of Mo-doped In₂O₃.* J. E. N. Swallow, B. A. D. Williamson, S. Sathasivam, M. Birkett, T. J. Featherstone, P. A. E. Murgatroyd, H. J. Edwards, Z. W. Lebens-Higgins, D. A. Duncan, M. Farnworth, P. Warren, Ni. Peng, T.-L. Lee, L. F. J. Piper, A. Regoutz, C. J. Carmalt, I. P. Parkin, V. R. Dhanak, D. O. Scanlon, T. D. Veal, *Materials Horizons*, 2020, **7**, 236.
10. *Scalable Production of Ambient Stable Hybrid Bismuth-Based Materials: AACVD of Phenethylammonium Bismuth Iodide Films.* M. Wang, C. Sanchez-Perez, F. Habib, M. O. Blunt, C. J. Carmalt, *Chem Eur. J.* 2021, **27**, 9406.
11. *ZnO/BiOI heterojunction photoanodes with enhanced photoelectrochemical water oxidation activity.* Wang, M., Kafizas, A., Sathasivam, S., Blunt, M. O., Moss, B., Gonzalez-Carrero, S., & Carmalt, C. J. *Applied Catalysis B: Environmental*, 2023, **331**, 122657. doi:10.1016/j.apcatb.2023.122657.

Full publication list can be found via [google scholar](#) or <https://www.ucl.ac.uk/chemistry/people/claire-carmalt>