

Michael David Ward

Personal Details

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Research & Education

2012 – Present *Postdoctoral Fellow, Lawrence Berkeley National Laboratory*

I am currently a postdoctoral researcher at Lawrence Berkeley National Laboratory's Advanced Light Source (ALS). My research involves studying the kinetics of chemical reactions relevant to combustion processes and atmospheric chemistry. Specifically, I use analytical tools such as mass spectrometry, gas chromatography and particle size analysis to derive kinetic parameters for heterogeneous reactions of free radicals with model organic aerosols. A complementary part of my research involves modelling these heterogeneous reactions with stochastic kinetic models to discover their chemical mechanisms.

2008 – 2012 *Graduate Researcher and Teaching Assistant, University College London*

PhD Supervisor: Prof. Stephen Price
MSci Project Title: Reactions of hydrogen and oxygen atoms on interstellar grain analogues.

The Cosmic Dust experiment involved studying the reactions of molecules with radicals (oxygen or hydrogen atoms) on the surface of an interstellar dust grain analogue under astrophysically relevant conditions. The purpose of the work was both to identify which reaction pathways may occur in the interstellar medium and to elucidate the kinetics of these reactions. The work had two important outcomes, firstly we were able to identify for the first time the separate contributions of the Langmuir-Hinshelwood and Eley Rideal mechanisms to certain reaction rates, and secondly we identified several reactions which yield products of interest as potential prebiotic species.

2004 – 2008 *University College London, MSci (Hons) Chemistry*

Project Supervisor: Prof. Stephen Price
MSci Project Title: Chemistry in Space: Studying the Formation of H₂ on Interstellar Dust.

Teaching & Mentoring

2008 – Present *Physical Chemistry Teaching Assistant, University College London*

As the physical chemistry section teaching assistant I have undertaken a number of teaching roles whilst pursuing my PhD at UCL, including:

Laboratory Demonstrating:

- Chemistry for Biologists (1st Year Course)
- Basic Physical Chemistry (1st Year Course)
- Physical Chemistry (2nd Year Course)
- Physical Chemistry for Medicinal Chemistry and Life Sciences (2nd Year Course)

Workshop Demonstrating:

- Foundations in Chemistry (1st Year Course)
- Quantitative Chemistry (1st Year Course)

Tutorial Leader:

- Basic Physical Chemistry (1st Year Course)

Beyond my duties as a teaching assistant, I have also been responsible for the day to day supervision of two MSci students as well as a summer student working on the Cosmic Dust experiment.

Awards

- In 2011 I was awarded the Best Inorganic/Physical/Materials Chemistry Poster Prize (£100) at the University College London Chemistry Department Postgraduate Poster Competition.
- In 2012 I was awarded the Ramsay Medal. The Ramsay Medal is awarded annually to the top postgraduate student studying in the final year at the University College London Dept. of Chemistry.

Publications

Electron ionization of methane: The dissociation of the methane monocation and dication.

Ward, M. D., King, S. J., Price, S. D., *J. Chem. Phys.*, 2011, **134**, 024308.

Thermal Reactions of Oxygen Atoms with Alkenes at Low Temperatures on Interstellar Dust.

Ward, M. D., Price, S. D., *Ap. J.*, 2011, **741**, 121.

Thermal Reactions of Oxygen Atoms with Carbon Disulfide at Low Temperatures on Interstellar Dust.

Ward, M. D., Hogg, I. A., Price, S. D., *Mon. Not. R. Astron. Soc.* 2012, **425**, 1264.

*Modelling of *c*-C₂H₄O formation on grain surfaces.*

Occhiogrosso, A., Viti S., Ward M. D., Price S. D. *Mon. Not. R. Astron. Soc.* 2012, **427**, 2450.

A Thermal Route to Interstellar Hydroxylamine.

Ward, M. D., Leong, K. M., Price, S. D., In preparation.

Conferences

- Jan 2009** *Annual Meeting of the Spectroscopy and Dynamics Group, University of Nottingham*
- Oct 2010** *LASSIE Astrochemistry Young Researchers Meeting, University College London*
Presentation title: "Reactions of Small Alkenes with Oxygen Atoms on Interstellar Dust Grain Surfaces".
- April 2011** *Workshop Astrochemistry: Molecular Networks Connecting the Universe, Amsterdam*
Poster title: "Studies of the Reactions of Oxygen Atoms on Interstellar Grain Analogues".
- Jan 2012** *Annual Meeting of the Spectroscopy and Dynamics Group, University of Leicester*
Presentation title: "Reactions of Oxygen and Hydrogen Atoms with Molecular Ices of Astrophysical Interest".