

Matthew Chambers

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[Google Scholar](#)

I am an enthusiastic researcher who has experience working at world-leading research centers, such as Oak Ridge National Laboratory and Diamond Light Source. In addition to directly working on synchrotron beamlines, I am well versed in techniques such as neutron powder diffraction and total scattering, multiple synthetic techniques including solid-state, sol-gel, combustion and thin film synthesis, impedance spectroscopy and small-angle X-ray scattering.

EDUCATION

- PhD, Dept. Chemistry, Durham University and Diamond Light Source Ltd. 2015–2019
- MChem, Dept. Chemistry, University of Reading, 1st class 2011–2015

RESEARCH EXPERIENCE

Chemical Sciences Division, Oak Ridge National Laboratory 2022–

Postdoctoral researcher

Supervisors: Gabriel Veith (solid electrolytes), Ethan Self (DRX cathodes)

- Exploring inorganic solid-state synthesis of solid-state electrolytes in a mechanistic manner
- Synthesizing Li cathode materials through combustion synthesis
- Collecting and analyzing total scattering and powder diffraction data
- Using gloveboxes to handle air-sensitive reactants and samples (LiH, n-butyl lithium)
- Training new users on and helping to troubleshoot laboratory X-ray diffractometers (Rigaku SmartLab, MiniFlex)

Dept. Chemistry, University of Birmingham 2019–2021

Research Fellow in Chemistry (Materials structure analysis)

Supervisor: Dr Zoe Schnepf

- Analyzing *in-situ* total scattering data of sol-gel synthetic process of Fe(NO₃)₃/gelatin, including the local structure of Fe₃N and Fe₃C nanoparticles (paper published)
- Analyzing *in-situ* SAXS data of sol-gel synthetic process of Fe₃C nanoparticles (paper published)

Dept. Chemistry, Durham University, Diamond Light Source Ltd.

2015–2019

Postgraduate Researcher – I secured a prestigious joint Durham-Diamond Light Source PhD scholarship

Thesis: “Oxide-Ion Conductors for Energy Applications: Structure and Properties”, Supervisors: Durham: Prof. Ivana Evans, Prof. John Evans; Diamond: Dr Phil Chater

Dept. Chemistry, University of Reading

2011–2015

Undergraduate research

Final-year project: “Negative Thermal Expansion and Vapochromism in Transition-Metal Cyanides”, Supervisor: Dr Ann Chippindale

Undergraduate Research Opportunities Programme: “The Incredible Shrinking Crystals”,

PUBLICATIONS

- **Chambers, M. S.**; Liu, J.; Borkiewicz, O. J.; Veith, G. M.; Elucidating the Local Structures of $\text{Li}_{1+x}\text{Al}_x\text{Ti}_{2-x}(\text{PO}_4)_3$ and $\text{Li}_3\text{Al}_x\text{Ti}_{2-x}(\text{PO}_4)_3$ ($x = 0, 0.3$) via Total Scattering, *submitted*
- **Chambers, M. S.**; Keum, J.; Li, T.; Clément, R. J.; Armstrong, B. L.; Self, E. C.; Exploring a New Synthesis Route to Lithium-excess Disordered Rock Salt (DRX) Cathode Materials, *submission imminent*
- Wang, T.; Ock, J.; X. Chen, C.; Wang, F.; Li, M.; **Chambers, M. S.**; Veith, G. M.; Shepard, L. B.; Sinnott, S. B.; Chi, M.; Bhattacharya, A.; Clément, R. J.; Sokolov, A. P.; Dai, S.; Flux Synthesis of A-site Disordered Perovskite $\text{La}_{0.5}\text{M}_{0.5}\text{TiO}_3$ ($M = \text{Li}, \text{Na}, \text{K}$) Nanorods Tailored for Solid Composite Electrolytes, *manuscript submitted*
- **Chambers, M. S.**; Chen, J.; Sacci, R. L.; McAuliffe, R. D.; Sun, W.; Veith, G. M.; Memory Effect on the Synthesis of Perovskite-Type Li-Ion Conductor $\text{Li}_x\text{La}_{2/3-x/3}\text{TiO}_3$ (LLTO), *Chemistry of Materials*, **2024**, 36, 3, 1197–1213
- Araño, K. G.; Yang, G.; Armstrong, B. L.; Aytug, T.; **Chambers, M. S.**; Self, E. C.; Meyer, H. M.; Quinn, J.; Browning, J. F.; Wang, C.; Veith, G. M.; Carbon Coating Influence on the Formation of Percolating Electrode Networks for Silicon Anodes, *ACS Applied Energy Materials*, **2023**, 6, 21, 11308–11321
- **Chambers, M. S.**; Hunter, R. D.; Hollamby, M. J.; Pauw, B. R.; Smith, A. J.; Snow, T.; Danks, A. E.; Schnepf, Z., In Situ and Ex Situ X-ray Diffraction and Small-Angle X-ray Scattering Investigations of the Sol–Gel Synthesis of Fe_3N and Fe_3C , *Inorganic Chemistry*, **2022**, 61, 18, 6742–6749
- **Chambers, M. S.**; Keeble, D. S.; Fletcher, D. C; Hriljac, J. A.; Schnepf, Z., The Evolution of Local Structure in a Sol-Gel Synthesis of Fe_3C Nanostructures, *Inorganic Chemistry*, **2021**, 60, 10, 7062–7069

- **Chambers, M. S.**; Chater, P. A.; Evans, J. S. O.; Evans, I. R., Average and local structure of germanium apatites and implications for oxide ion conductivity, *Inorganic Chemistry*, **2019**, 58, 21, 14853–14862
- **Chambers, M. S.**; McCombie, K.S.; Auckett, J. E.; McLaughlin, A. E.; Irvine, J. T. S.; Chater, P. A.; Evans, J. S. O.; Evans, I. R., Hexagonal perovskite related oxide ion conductor $\text{Ba}_3\text{NbMoO}_{8.5}$: Phase transition, temperature evolution of the local structure and properties, *Journal of Materials Chemistry A*, **2019**, 7, 25503–25510
- Peet, J. R; **Chambers, M. S.**; Piovano, A.; Johnson, M. R; Evans, I. R., Dynamics in Bi(III)-containing apatite-type oxide ion conductors: a combined computational and experimental study, *Journal of Materials Chemistry A*, **2018**, 6 (12), 5129–5135

SUPERVISION EXPERIENCE

- Train new users to use the Rigaku SmartLab and Miniflex laboratory X-ray diffractometer
- Tutor on Durham Powder Diffraction and Rietveld Refinement School, 2018. Taught school of PhD+ level students, tutoring crystallography problem classes and software (TOPAS) classes
- Demonstrator to undergraduate students of MChem Chemistry and MSc Natural Sciences, 2015–2016, 2017–2018

CONFERENCES

Talks

- *ECS 245th meeting*, Exploring a New, Scalable Synthesis Route to Disordered Rock Salt (DRX) Cathode Materials
 - Will occur 05/26/2024
 - Session chair: A02 – Cathode and Anode 1
- *ACS Spring 2024 Many Flavors of Chemistry*, 2024, Elucidating the Local Structures of $\text{Li}_{1+x}\text{Al}_x\text{Ti}_{2-x}(\text{PO}_4)_3$ and $\text{Li}_3\text{Al}_x\text{Ti}_{2-x}(\text{PO}_4)_3$ ($x = 0, 0.3$) via Total Scattering
 - Session Presider (Energy and Fuels – Solid State Batteries: Materials, Interfaces, and Cell Integration, two sessions)
 - Presented at two sessions (Energy and Fuels, Inorganic Chemistry – Materials and Design)
- *11th Annual ORPA Symposium*, Energy landscape of $\text{Li}_x\text{La}_{2/3-x/3}\text{TiO}_3$ (LLTO) synthesis explored via structurally similar precursors
- *ACS Spring 2023 Crossroads of Chemistry*, 2023, Energy landscape of $\text{Li}_x\text{La}_{2/3-x/3}\text{TiO}_3$ (LLTO) synthesis explored via structurally similar precursors
 - Session Presider (Inorganic Chemistry – Materials and Design)
- *Durham Department of Chemistry Annual Postgraduate Symposium*, 2018, Whetting Your Apatite for Total Scattering Analysis; won one of three oral presentation prizes
- *British Conference of Undergraduate Research*, 2015, The Incredible Shrinking Crystals

Posters

- *ISIS Crystallography User Group Meeting PCG-SCMP Winter Meeting, 2017, $\text{La}_8\text{R}_2(\text{GeO}_4)_6\text{O}_{3-y}$ apatite oxide ion conductors: local structure*
- *ISIS Crystallography User Group Meeting PCG-SCMP Winter Meeting, 2016, $\text{La}_8\text{R}_2(\text{GeO}_4)_6\text{O}_{3-y}$ (R = La, Bi, Sr, Y) Apatites: Structure and Symmetry*
- *Undergraduate Research Opportunities Programme Conference, 2014, The Incredible Shrinking Crystals; won 1st place in Science and Technology category*

Attended

- *BAM Better with Scattering Workshop (attended online), 2020*
- *Diamond Light Source XAS Workshop, 2017*
- *BCA Industrial Autumn Group Meeting, 2016*
- *School and Conference on Analysis of Diffraction Data in Real Space, 2016*
- *ISIS Crystallography User Group Meeting PCG-SCMP Winter Meeting, 2015*

REVIEWED PROPOSALS

- US Department of Energy SBIR/STTR Program (2024)

TRANSFERABLE SKILLS

- Public speaking
- Long document writing/word processing
- Time management
- Data organization

LANGUAGES

- English (native speaker)
- German (CEFR level B1/B2)

REFEREES

Dr Gabriel Veith, Postdoctoral research supervisor, Chemical Sciences Division, Oak Ridge National Laboratory, Email: veithgm@ornl.gov, Telephone: +1 (865)576-0027

Dr Zoe Schnepf, Postdoctoral research supervisor, School of Chemistry, University of Birmingham, United Kingdom, Email: z.schnepf@bham.ac.uk, Telephone: +44 1214143530

Dr Philip Chater, PhD supervisor, Diamond Light Source Limited, United Kingdom, Email: philip.chater@diamond.ac.uk, Telephone: +44 1235778677