



European Materials Research Society

# Spring Meeting 2022

May 30 | June 3  
Virtual Conference

## SYMPOSIUM F

Advances and enhanced functionalities  
of anion-controlled new inorganic materials-ANIM 4

Symposium Organizers :

Alain DEMOURGUES, University of Bordeaux, CNRS, ICMCB

Katsuro HAYASHI, Department of Applied Chemistry,  
Graduate School of Engineering, Kyushu University

Michael HAYWARD, University of Oxford

Sossina HAILE, Dept. of Materials Science and Engineering,  
Dept. of Chemistry, Applied Physics Program;  
Northwestern University



Dalton  
Transactions

|       |   |        |
|-------|---|--------|
| 08:45 | <b>Welcome and Introduction to the Symposium</b>  |        |
|       | <b>Topochemical synthesis : Michael Hayward</b>   |        |
| 09:00 | <b>INV Dehydration of electrochemically protonated oxides</b><br>Hiroschi Kageyama<br>Kyoto University  | F I.1  |
| 09:30 | <b>Topochemical Copper Deintercalation from Intergrowth Manganese Oxysulphide, Possible Competition of Cation and Anion Redox</b><br>Shunsuke Sasaki (1 and 2), Souvik Giri (1), Simon Cassidy (1), Sunita Dey (3), Maria Batuk (4), Daphne Vandemeulebroucke (4), Clare Grey (3), Joke Hadermann (4), Simon Clarke (1)<br>(1) Department of Chemistry, University of Oxford, Oxford OX1 3QR, UK, (2) Université de Nantes, CNRS, Institut des Matériaux de Nantes Jean Rouxel, IMN, F-44000 Nantes, France, (3) Department of Chemistry, University of Cambridge, Cambridge CB2 1EW, UK, (4) Electron Microscopy for Materials Science (EMAT), University of Antwerp, Groenenborgerlaan 171, B-2020, Antwerp, Belgium. | F I.2  |
| 09:45 | <b>Low temperature synthesis of alkaline earth oxynitridosilicate phosphors using metal carbodiimides</b><br>Yuji Masubuchi, Naoki Sada, Hiroshi Shibuya, Mikio Higuchi<br>Hokkaido University  | F I.3  |
| 10:00 | <b>In situ and ex situ electron microscopy revealing diverse structural transformations of <math>\text{La}_x\text{Sr}_{2-x}\text{MnO}_{4-\delta}</math> upon gas reduction</b><br>Vandemeulebroucke D.* (1), Batuk M. (1), Roussel P. (2), Hadermann J. (1)<br>(1) EMAT, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium, (2) Ecole Nationale Supérieure de Chimie de Lille, Avenue Mendeleiev Bât C7 CS 90108, 59652 Villeneuve-d'Ascq CEDEX, France   | F I.4  |
| 10:15 | <b>Discussion</b>   |        |
|       | <b>Electronic materials : Michael Hayward</b>   |        |
| 10:30 | <b>INV Tuning the chemical and physical properties of mixed-anion compounds</b><br>Simon J Clarke<br>University of Oxford   | F II.1 |
| 11:00 | <b>Giant entropy changes in charge-transition oxides</b><br>Yuichi Shimakawa, Yoshihisa Kosugi, Masato Goto<br>Kyoto University   | F II.2 |
| 11:15 | <b>Hybrid electrons in <math>\text{GaV}_4\text{O}_8</math> and comparison with its chalcogenides friends.</b><br>Aguilar-Maldonado, C., (1) Mentre, O., (1), Tsirlin, A.A., (2), Ritter, C., (3) & Arevalo-Lopez A. M. * (1).<br>(1) University of Lille, CNRS, UCCS-UMR8181, France (2) Augsburg University, Germany (3) ILL, France * lead presenter  | F II.3 |
| 11:30 | <b>Metastable rare earth oxysulfides synthesised by sulfur topochemical deintercalation</b><br>L.-B. Mvélé, S. Sasaki, M.T Caldes, C. Guillot Deudon, E. Gautron, I. Braems, E. Janod, B. Corraze, S. Jobic, L. Cario<br>Nantes Université, CNRS, Institut des Matériaux Jean Rouxel, IMN, F-44000 Nantes, France   | F II.4 |
| 11:45 | <b>Topotactic fluorination of intermetallics as new route for iron-based superconductivity</b><br>Jean-Baptiste Vaney1, Baptiste Vignolle1, Etienne Gaudin1, Etienne Durand1, Christine Labrugère2, Fabio Bernardini3, Andrés Cano4, Alain Demourgues1, Sophie Tencé1<br>1 CNRS, Université Bordeaux, ICMCB, UMR 5026, 33600 Pessac, France, 2 CNRS, Univ. Bordeaux, PLACAMAT UMS 3626, Pessac, F-33600, France, 3 Dipartimento di Fisica, Università di Cagliari, IT-09042 Monserrato, Italy, 4 CNRS, Université Grenoble Alpes, Institut Néel, 38042 Grenoble, France   | F II.5 |
| 12:00 | <b>Discussion</b>   |        |
| 12:15 | <b>Lunch and Plenary</b>  |        |

|       |  |          |
|-------|--|----------|
| 15:00 | <b>INV Designing polar mixed-anion materials</b><br>Emma E. McCabe<br>Durham University  | F III.1  |
| 15:30 | <b>Crystal chemistry and properties of magnetic Aurivillius oxyfluorides</b><br>Olivier Mentré, Angel Arevalo-Lopez, Marielle Huvé, Marie Colmont, Miguel Juárez-Rosete, Sébastien Saitzek<br>UCCS, UMR CNRS 8181, Univ. Lille-Artois-Ecole Centrale-CNRS, Villeneuve d'Ascq /Lille France   | F III.2  |
| 15:45 | <b><math>\text{La}_2\text{NiO}_2.5\text{F}_3</math> : A New Ruddlesden-Popper Oxyfluoride with unexpected structure, optical and magnetic properties</b><br>Stefan G. Ebbinghaus, Jonas Jacobs, Miguel A. L. Marques, Hai-Chen Wang, Emil Dieterich<br>Institut für Chemie Festkörperchemie Martin-Luther-Universität Halle-Wittenberg D-06120 Halle Germany, Institut für Chemie Festkörperchemie Martin-Luther-Universität Halle-Wittenberg D-06120 Halle Germany, Institut für Physik Martin-Luther-Universität Halle-Wittenberg D-06120 Halle, Germany, Institut für Physik Martin-Luther-Universität Halle-Wittenberg D-06120 Halle, Germany, Institut für Chemie Technische Chemie I Martin-Luther-Universität Halle-Wittenberg  | F III.3  |
|       | <b>Complex mixed-anion materials : Sossina Haile</b>   |          |
| 16:00 | <b>INV Tuning optical and nonlinear optical properties from mixed anion building blocks</b><br>Houria Kabbour(a), Batoul Almoussawi(a), Mike Whangbo(b, c), Pascal Roussel(a), Sébastien Saitzek(a), Shuiquan Deng(c)<br>(a) Univ. Lille, CNRS, Centrale Lille, ENSCL, Univ. Artois, UMR 8181 &#8211; UCCS &#8211; Unité de Catalyse et Chimie du Solide, F-59000 Lille, France, (b) Department of Chemistry, North Carolina State University, Raleigh, NC 27695-8204, USA, (c) State Key Laboratory of Structural Chemistry, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou 350002, Fujian, P. R. China   | F F IV.1 |
| 16:30 | <b>3D ED for determining anion order, ex situ and in situ</b><br>Maria Batuk, Daphne Vandemeulebroucke, Joke Hadermann<br>EMAT, Department of Physics, University of Antwerp   | F F IV.2 |
| 16:45 | <b>Using multiple anion chemistry to generate extremely low thermal conductivities in layered inorganic solids</b><br>Quinn D. Gibson <sup>1</sup> , Tianqi Zhao <sup>2</sup> , Luke M. Daniels <sup>1</sup> , Helen C. Walker <sup>3</sup> , Ramzy Daou <sup>4</sup> , Sylvie Hébert <sup>4</sup> , Marco Zanella <sup>1</sup> , Matthew S. Dyer <sup>1</sup> , John B. Claridge <sup>1</sup> , Ben Slater <sup>2</sup> , Michael W. Gaultois <sup>1,5</sup> , Furio Corà <sup>2</sup> , Jonathan Alaria <sup>6*</sup> , Matthew J. Rosseinsky <sup>1</sup><br>1 University of Liverpool Department of Chemistry, Crown Street, Liverpool, L69 7ZD, United Kingdom, 2 University College London Department of Chemistry, 20 Gordon Street, Kings Cross, London WC1H 0AJ, United Kingdom, 3 ISIS Rutherford Appleton Laboratory, Chilton, Didcot, OX11 0QX, United Kingdom, 4 Laboratoire CRISMAT, UMR 6508 CNRS, ENSICAEN, UNICAEN, Normandie Université, 6 bd du Maréchal Juin, 14050 Caen, France, 5 Leverhulme Research Centre for Functional Materials Design, The Materials Innovation Factory, University of Liverpool 51 Oxford Street, Liverpool L7 3NY, UK, 6University of Liverpool Department of Physics, Oliver Lodge Laboratory, Liverpool, L69 ZE, United Kingdom | F F IV.3 |
| 17:00 | <b>Discussion F.III and F.IV</b>   |          |
|       | <b>: Michael Hayward</b>   |          |
| 17:15 | <b>Synthesis of Nanostructured Molybdenum Nitride and Carbide Catalysts Using Metal Cluster Compounds as Precursors.</b><br>Guillaume DUBOIS 1, Corinne LAGROST 1, Kévin GUY 1,2, Tetsuo UCHIKOSHI 2, Stéphane CORDIER 1, Fabien GRASSET 1,2, Franck TESSIER 1.<br>1 Univ. Rennes, CNRS, Institut des Sciences Chimiques de Rennes – UMR 6226, F-35000 Rennes, France 2 LINK, IRL3629 CNRS-Saint-Gobain-NIMS, NIMS, Tsukuba, Japan   | F PI.1   |
| 17:15 | <b>Plasma Functionalized <math>\text{MoSe}_2</math> for Efficient Non-Enzymatic Sensing of Hydrogen Peroxide in Ultra-Wide pH Range</b><br>Yang Luo 1,2, Artur Braun 1, Paul K. Chu 2<br>1. Empa (Swiss Federal Laboratories for Materials Science and Technology), ETH Domain, Dübendorf 8600, Switzerland 2. Department of Physics, City University of Hong Kong, Hong Kong 999077, China  | F PI.2   |

|       |   |         |       |  |        |
|-------|---|---------|-------|--|--------|
| 17:15 | <b>Fe and Co-based oxyfluorides as electrodes for high temperature fuel cells / electrolysis applications</b><br>Jacinthe Gamon,* Jean-Marc Bassat,* Alain Demourgues,* Joke Hadermann,** Maria Batuk,** Mathieu Duttine,* Sébastien Fourcade,* Etienne Durand,* Christine Labrugère,** Elise Bonnet.*<br>*Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB), Université de Bordeaux, Bordeaux INP, CNRS, UMR 5026, 87 Avenue du Dr Albert Schweitzer, 33600 Pessac, France **EMAT, University of Antwerp, Groenenborgerlaan 171, B-2020 Antwerp, Belgium ***PLACAMAT, UMS3626, CNRS-Université de Bordeaux, 87 Avenue Docteur Albert Schweitzer, 33600 Pessac, France | F PI.3  |       |  |        |
|       |   |         |       | <b>Thursday June 2</b>   |        |
|       |   |         |       | <b>Thin films : Katsuro Hayashi</b>  |        |
|       |   |         | 09:00 | <b>INV Thin film engineering of mixed anion perovskites</b><br>T. Hasegawa*(1), T. Katayama(2), A. Chikamatu(3) & Y. Hirose(1)<br>*(1) University of Tokyo, Japan (2) Hokkaido University, Japan (3) Ochanomizu University, Japan  | F V.1  |
|       |   |         | 09:30 | <b>Photochromism of rare-earth oxyhydrides studied by Positron Annihilation Spectroscopy</b><br>Ziyang Wu1, Tom de Krom1, Giorgio Colombi2, Diana Chaykina2,1, Henk Schut1, Marcel Dickmann3, Werner Egger3, Christoph Hugenschmidt4, Ekkes Brück1, Bernard Dam2, Stephan W.H. Eijt1<br>1 Department of Radiation Science and Technology, Faculty of Applied Sciences, Delft University of Technology, Delft, The Netherlands, 2 Materials for Energy Conversion and Storage, Department of Chemical Engineering, Faculty of Applied Sciences, Delft University of Technology, Delft, The Netherlands, 3 Institut für angewandte Physik und Messtechnik, Bundeswehr Universität München, Germany, 4 Physics Department and Heinz Maier-Leibnitz Zentrum (MLZ), TU München, Germany   | F V.2  |
| 17:15 | <b>Low temperature topochemical manipulation of Ru-containing perovskite oxides</b><br>Zhilin Liang, Michael A. Hayward<br>Department of Chemistry, University of Oxford, Inorganic Chemistry Laboratory, Oxford OX1 3QR, U.K   | F PI.4  |       |  |        |
| 17:15 | <b>Structure and magnetism of soft chemically synthesized Sr2MnO2Li2Se2</b><br>Souvik Giri and Simon Clarke<br>Inorganic chemistry laboratory, Department of Chemistry, University of Oxford  | F PI.5  |       |  |        |
| 17:15 | <b>Understanding of the role of anions in alkali-rich antiperovskites towards enhanced ionic conductivity</b><br>Shenghan Gao, Susumu Fujii, Thibault Broux, Cédric Tassel, Tong Zhu, Hiroki Ubukata, Kentaro Yamamoto, Kotaro Fujii, Masatomo Yashima, Yoshiharu Uchimoto, Akihide Kuwabara, Hiroshi Kageyama<br>Kyoto University: Shenghan Gao, Thibault Broux, Cédric Tassel, Hiroki Ubukata, Kentaro Yamamoto, Tong Zhu, Yoshiharu Uchimoto, Hiroshi Kageyama Japan Fine Ceramics Center: Susumu Fujii, Akihide Kuwabara Tokyo Institute of Technology: Kotaro Fujii, Masatomo Yashima  | F PI.6  |       |  |        |
| 17:15 | <b>Discovering Efficient Biomass Valorisation Electrocatalysts Via Anion Control In Phosphate Based Materials</b><br>Kevin LEMOINE, Nikolay KORNIENKO, Yoshiyuki INAGUMA<br>Gakushuin University, Tokyo, Japan, Université de Montréal, Montréal, Canada  | F PI.7  |       |  |        |
| 17:15 | <b>Photochromism and Photoconductivity in RE oxyhydride thin films</b><br>G. Colombi, D. Chaykina, B. Boshuizen, M. Bus, H. Schreuders, T. J. Savenije, B. Dam<br>Delft University of Technology, The Netherlands   | F PI.8  |       |  |        |
| 17:15 | <b>Manipulation of the anionic and cationic sub-lattices of pyrochlores.</b><br>Edouard Boivin [1], Frédérique Pourpoint [1], Sébastien Saitzek [1], Pascal Roussel [1], Houria Kabbour [1]<br>[1] Univ. Lille, CNRS, Centrale Lille, ENSCL, Univ. Artois, UMR 8181-UCCS-Unité de Catalyse et Chimie du Solide, F-59000 Lille, France   | F PI.9  |       |  |        |
| 17:15 | <b>Combining (PO4)3- and O2- (oxo)-anions into a new class of layered tungsten bronzes, with fine redox control</b><br>H. Nimoh (1, 2), R. Giaum (2), A. Cano (3), A. M. Arévalo-López (1), O. Mentré (1)<br>(1) UCCS (Unité de Catalyse et Chimie du Solide), Université de Lille, Centrale Lille/ ENSCL, 59000, Lille, France, (2) Institut für Anorganische Chemie, Rheinische Friedrich-Wilhelms Universität Bonn, Gerhard-Domagk-Str. 1 53121 Bonn, Germany, (3) Institut NEEL CNRS/UGA UPR2940, 25 rue des Martyrs, BP 166, 38042, Grenoble, France   | F PI.10 |       |  |        |
| 17:15 | <b>Eco-friendly synthesis of CaFe2O4 for electrical energy storage</b><br>H. Coutinho Gomes1, S. Soreto Teixeira1, José F. Nunes2, Cristiane C.M. Salgueiro2, A.F.L. Almeida3, F.N.A. Freire3 and M.P.F. Graca1*<br>1 I3N-Physics department, University of Aveiro, 3810-193 Aveiro-Portugal 2 Department of Veterinary Medicine, State University of Ceará, Fortaleza, Ceará, Brazil 3 Department of Mechanical Engineering, Federal University of Ceará - Brazil  | F PI.11 |       |  |        |
| 18:00 | <b>E-MRS EU-40 Materials Prize &amp; MRS Mid-Career Researcher Award Presentations</b>  |         |       |  |        |
|       |   |         | 09:45 | <b>Tuning the composition of tantalum oxynitride thin films thanks to reactive sputtering techniques for photocatalytic application</b><br>A. Diop 1,2, A. Bousquet 1, F. Zoubian 1, C. Taviot-Guého 1, J. Cellier 1, G. Monier 3, C. Robert-Goumet 3, E. Tomasella 1, L. Thomas 2.<br>1 Université Clermont Auvergne, CNRS, Institut de Chimie de Clermont -Ferrand, F-63000 Clermont-Ferrand 2 Université Perpignan Via Domitia, Laboratoire Procédés Matériaux Energie Solaire (PROMES), Tecnosud-Rambla de la Thermodynamique, 66100 Perpignan cedex, France 3 Université Clermont Auvergne, Clermont Auvergne INP, CNRS, Institut Pascal, F-63000 Clermont-Ferrand, France  | F V.3  |
|       |   |         | 10:00 | <b>Influence of crystal structure and defects on photochromic neodymium oxyhydride thin films</b><br>Chaykina, D.*(1), Nafezarefi, N.(1), Colombi, G.(1), Cornelius, S.(1,2), Bannenberg, L. J.(1), Schreuders, H.(1), Dam, B.(1)<br>(1)Materials for Energy Conversion and Storage, Department of Chemical Engineering, Delft University of Technology, The Netherlands (2)Fraunhofer Institute of Organic Electronics, Electron Beam and Plasma Technology (FEP), Germany  | F V.4  |
|       |   |         | 10:15 | <b>Discussion</b>  |        |
|       |   |         |       | <b>Theory / photocatalysis : Alain Demourgues</b>  |        |
|       |   |         | 10:30 | <b>INV Novel nitrogen-based solids by means of synthetic and theoretical approaches</b><br>Richard Dronskowski<br>Chair of Solid-State and Quantum Chemistry, RWTH Aachen University   | F VI.1 |
|       |   |         | 11:00 | <b>Bi4AO6Cl2 (A = Ba, Sr, Ca) with Double and Triple Fluorite Layers for Visible-light Water Splitting</b><br>Chengchao Zhong, Daichi Kato, Kanta Ogawa, Cédric Tassel, Fujio Izumi, Hajime Suzuki, Shogo Kawaguchi, Takashi Saito, Akinori Saeki, Ryu Abe,* Hiroshi Kageyama*<br>Chengchao Zhong (Graduate School of Engineering, Kyoto University, Kyoto, Japan), Daichi Kato (Graduate School of Engineering, Kyoto University, Kyoto, Japan), Kanta Ogawa (Graduate School of Engineering, Kyoto University, Kyoto, Japan), Cédric Tassel (Graduate School of Engineering, Kyoto University, Kyoto, Japan), Fujio Izumi (Graduate School of Engineering, Kyoto University, Kyoto, Japan), Hajime Suzuki (Graduate School of Engineering, Kyoto University, Kyoto, Japan), Shogo Kawaguchi (Spring-8, Japan Synchrotron Radiation Research Institute, Hyogo, Japan), Takashi Saito (High Energy Accelerator Research Organization (KEK), Ibaraki, Japan), Akinori Saeki (Graduate School of Engineering, Osaka University, Osaka, Japan), Ryu Abe (Graduate School of Engineering, Kyoto University, Kyoto, Japan), Hiroshi Kageyama (Graduate School of Engineering, Kyoto University, Kyoto, Japan) | F VI.2 |
|       |   |         | 11:15 | <b>Competition between the α- and the layered LaOInS2 structure types upon cationic and anionic substitution: impact on the photoc</b><br>Maxime Braun (1), Sébastien Saitzek (1), Edouard Boivin (1), Laurent Cario (2), Pascal Roussel (1), Houria Kabbour (1)<br>(1) Univ. Lille, CNRS, Centrale Lille, ENSCL, Univ. Artois, UMR 8181-UCCS-Unité de Catalyse et Chimie du Solide, F-59000 Lille, France (2) Institut des Matériaux Jean Rouxel (IMN), Université de Nantes, CNRS, 2 rue de la Houssinière, 44322 Nantes Cedex 3, France   | F VI.3 |

