

SYMPOSIUM L

Chromogenic materials and devices

Symposium Organizers :

Aline ROUGIER, ICMCB, UMR-CNRS 5026

Bernard DAM, Delft University of Technology, Chemical Engineering

Fabien CAPON, Institut Jean Lamour

Smagul KARAZHANDOV, Institute for Energy Technology

Monday may 30

08:45 Welcome and Introduction to the Symposium - B. Dam, F. Capon, S. Karazhanov, A. Rougier

I : Fabien Capon –

09:00 Temperature-Responsive Reflective Coatings for Smart Windows L I.1
Albert Schenning
Eindhoven University of Technology

09:30 Thermochromic properties of NiTiO₃ L I.2
Acher, L. (1), Ji, H*(1)., Garino, N. (1), Massuyeau, F.(2), Jobic, S.(2), Pontille, L. (1), Cauwet, F. (1), Ferro, G. (1), & Carole, D. (1).
(1) Laboratoire des Multimatériaux et Interfaces, UMR CNRS 5615, Université Claude Bernard Lyon 1, F-69622 Villeurbanne, France (2) Institut des Matériaux Jean Rouxel, IMN, Université de Nantes, CNRS, F-44000 Nantes, France * lead presenter

09:45 Thermochromic Coatings and Laminates for Smart Windows Comprising W-Doped VO₂ Nanopigments L I.3
Hupperetz, J.F.B.(1)(2), Yeung, C.P.K.(1)(2), Habets, R.(1)(2), Leufkens, L.(1)(2), van Zandvoort, R.(1)(2), Wolters, D.(1)(2), Meulendijks, N.(1)(2), Mann, D.(1)(2), Buskens, P(1)(2)(3).
(1) The Netherlands Organisation for Applied Scientific Research (TNO), High Tech Campus 25, 5656AE Eindhoven, The Netherlands. (2) Brightlands Materials Center, Urmonderbaan 22, 6167RD Geleen, The Netherlands. (3) Hasselt University (UHasselt), Institute for Materials Research (IMO), DESINe group, Martelarenlaan 42, 3500 Hasselt, Belgium.

10:00 Oxidation of a novel V₂N precursor as an efficient method to form thermochromic VO₂ thin films L I.4
A.C. García-Wong, D. Pilloud, S. Bruyère, F. Capon, J.F. Pierson
Institut Jean Lamour, UMR 7198, CNRS-Université de Lorraine, Campus Artem, 2 allée André Guinier, 54011 Nancy, France.

10:15 Atomic Layer Deposition (ALD) of thermochromic VO₂ thin film L I.5
A. Jolivet a, J. Cardin a, C. Frilay a, O. Debieu b, P. Marie a, S. Duprey a, F. Lemarié a, X. Portier a, B. Horcholles a, P. Bazin c, J. More-Chevalier d, P. Fittl d, S. Cicho? d, J. Lan?ok d, Wojciech Jadwisieniczak e, David Ingram f, C. Labbé a a: CIMAP Normandie Université, ENSICAEN, UNICAEN, CEA, CNRS, 6 Bd Maréchal Juin, 14050 Caen Cedex 4, France, b: CIRIMAT, 4 allée Emile Monso, BP-44362, 31030 Toulouse Cedex 4, France, c: LCS Normandie Université, ENSICAEN, 6 Bd Maréchal Juin, 14050 Caen, France, d: Institute of Physics, Czech Academy of Sciences, Na Slovance 2, 18221 Praha 8, Czech Republic, e: School of Electrical Engineering and Computer Science, Ohio University, Athens, Ohio 45701, USA, f: Department of Physics and Astronomy, Ohio University, Athens, Ohio 45701, USA

10:30 Discussion

II : Aline Rougier - Anthony Maho

10:45 INV Fabry-Perot-type multi-color electrochromic materials and devices L II.1
Zhigang Zhao
Key Lab of Nanodevices and Applications, Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou 215123, China

11:15 Development of Variable Emissivity Polymer Coating for Thermal Radiator L II.2
Gwendoline Petroffe,(a) Vincent Roumegoux,(a) Jean-Paul Dudon,(b) Sophie Cantin,(a) Frédéric Vidal,(a) Pierre-Henri Aubert,(a)
(a) LPPI, CY Université, 5 mail Gay-Lussac, 95031 Cergy-Pontoise Cedex, France.
(b) Thales Alenia Space (TAS), 100 Boulevard du Midi, 06150 Cannes, France

11:30 Printable Fast-Curing Poly(ionic liquids) for Electrochromic Coordination Polymer L II.3
Wei Church Poh, Xuefei Gong, Alice Lee-Sie Eh, Pooi See Lee
School of Materials Science and Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798

11:45 Luminescent mechanochromic materials based on copper iodide compounds L II.4
Raquel Utrera-Melero, Florian Massuyeau, Jean-Yves Mevellec, Camille Latouche, and S. Perruchas
Université de Nantes, CNRS, Institut des Matériaux de Nantes Jean Rouxel, IMN, F-44000 Nantes, France.

12:00 Study of localized surface plasmon resonance(LSPR) induced electrolyte chemistry to achieve quadruple mode electrochromic device L II.6
Jiseon Kim*(1), Dongwon Shin(1), Sungjun Choi(1) and Caroline Sunyong Lee(1)
(1) Department of materials science and chemical engineering, Hanyang University, South Korea

12:15 Discussion

12:30 Lunch

III : Bernard Dam –

13:45 INV Photochromism in oxygen-containing rare-earth hydrides ? what have we learned? L III.1
D. Primetzhofer
Department of Physics and Astronomy, Uppsala University, Box 516, SE-751 20 Uppsala, Sweden

14:15 Photochromism in Rare-Earth Oxyhydride thin films L III.2
Bernard Dam1, Giorgio Colombi1, Diana Chaykina1, Zying Wu1, Gilles A. De Wijs2, Shrestha Banerjee2, Arno P. M. Kentgens2, Stephan W. H. Eijt1
1) Faculty of Applied Science, TU Delft, Delft, The Netherlands 2) Institute for Molecules and Materials, Radboud University, Nijmegen, The Netherlands

14:30 New dithienylethenes ? polyoxometalates hybrid materials with highly efficient solid-state photochromic properties L III.3
Patricia Bolle (a), Oleh Stetsiuk (a,b), Clotilde Menet (a), Marin Puget (a), Hélène Serier-Braut (a), Marie Cordier (b), Shohei Katao (c), Véronique Guerchais (b), Florent Boucher (a), Tsuyoshi Kawai (c), Julien Boixel (b), Rémi Dessapt (a)
(a) Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, IMN, F-44000 Nantes, France. (b) Univ Rennes, CNRS, ISCR ? UMR6226, F-35000, Rennes, France. (c) Nara Institute of Science and Technology, 8916-5 Takayama, Ikoma, Nara 630-0192, Japan.

14:45 Synthesis and optical/thermal reversible photo-switching of AgCl-AgPO₃ photochromic composite glass coatings for space applicati L III.4
Marios Adamidis, Ioannis Konidakis, Emmanuel Stratakis
Institute of Electronic Structure and Laser (IESL), Foundation for Research and Technology-Hellas (FORTH), 70013 Heraklion-Crete, Greece

15:00 INV Physics and crystal chemistry of rare-earth metal oxyhydride systems L III.5
A. Pishitshev*(1), E. Strugovshchikov(2), S. Z. Karazhanov(3)
(1)Institute of Physics, University of Tartu, W.Ostwaldi 1, 50411 Tartu, Estonia,(2) University of Rovira i Virgili, Tarragona, Spain,(3)Department for Solar Energy, Institute for Energy Technology, Kjeller, Norway

15:30 Discussion

1 : B. Dam, F. Capon, S. Karazhanov, A. Rougier

16:00 Mimicking Nature?s Butterflies: Electrochromic Devices with Dual-Sided Differential Colorations L P1.1
Jian Chen, Zhen Wang, Chenglong Liu, Zhigang Chen, Xueqing Tang, Qi Wu, Shu Zhang, Shan Cong, Qin Chen, Zhigang Zhao*
Key Lab of Nanodevices and Applications, Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou 215123, China?Key Laboratory of Multifunctional Nanomaterials and Smart Systems, Chinese Academy of Sciences (CAS), 215123 Suzhou, China?Institute of Nanophotonics, Jinan University, Guangzhou 511443, China

16:00 Attaining absolute 'private' state by dual stimulation of a thermo-electrochromic single-molecule L P1.2
John Marc C. Puguan, Hern Kim
Department of Energy Science and Technology, Environmental Waste Recycle Institute, Myongji University, Yongin, Gyeonggi-do 17058, Republic of Korea

			Tuesday may 31
			IV : Smagul Karazhanov &#8211
16:00	Development of dual responsive poly(ionic liquid)s for smart window/display application Pramod Vithal Rathod, Hern Kim* Lead Presenter: Pramod Vithal Rathod, Email: pramodrathod1992@gmail.com Corresponding author*: Hern Kim. Email: hernlim@mju.ac.kr Department of Energy Science and Technology / Environmental Waste Recycle Institute Myongji University, Yongin, Gyeonggi-do 17058, Republic of Korea	L P1.3	09:00 INV Multi-color changeable polyaniline based polymer and waterproof Prussian blue gasochromic materials Chih-Wei Hu, Kaori Nishizawa, Yasusei Yamada Innovative Functional Materials Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan
16:00	Thermochromic Solar Control Coatings on SiO2-Coated Float Glass for Energy-Efficient Smart Windows Yeung, C.P.K.*(1)(2), Habets, R.(1)(2), Leufkens, L.(1)(2), Colberts, F.(3), Stout, K.(3), Verheijen, M.A.(4)(5), Vroon, Z.(1)(2)(3), Mann, D.(1)(2), Buskens, P.(1)(2)(6). (1) The Netherlands Organisation for Applied Scientific Research (TNO), High Tech Campus 25, 5656AE Eindhoven, The Netherlands. (2) Brightlands Materials Center, Urmonderbaan 22, 6167RD Geleen, The Netherlands. (3) Zuyd University of Applied Sciences, Nieuw Eyckholt 300, 6400AN Heerlen, The Netherlands. (4) Department of Applied Physics, Eindhoven University of Technology, 5600MB Eindhoven, The Netherlands. (5) Eurofins Materials Science, 5656 AE Eindhoven, The Netherlands. (6) Hasselt University (UHasselt), Institute for Materials Research (IMO), DESIne group, Martelarenlaan 42, 3500 Hasselt, Belgium. * lead presenter	L P1.4	09:30 Evaluation of solar transmittance properties using dry-deposited trimodal electrochromic/mirror device for Zero-energy building. Sungjun Choi* (1), Jiseon Kim (1), Dongwon Shin (1) and Caroline Sunyong Lee (?), (1) Department of Material science & Chemical engineering in Hanyang University, Korea (? sunyonglee@hanyang.ac.kr)
16:00	Reactive e-beam evaporation of yttrium: A spectral and structural investigation of metallic yttrium, yttrium oxide, and yttrium H.Arslan, I.Aulika, A. Sarakovskis, L.Bikse, J. Gabrusenoks, M. Zubkins, J.Purans Institute of Solid State Physics, University of Latvia, R?ga LV-1063, Latvia	L P1.5	09:45 Hybrid Molybdenum-Tungsten Oxide as ?New Generation? Plasmonic Electrochromic Material for Smart Windows Gillissen, F.*(1,2), Maho, A.(1), De Moor, N.(3), Faceira, B.(4), Lobet, M.(3), Rougier, A.(4), Henrard, L.(3), Cloots, R(1). (1) Group of Research in Energy and Environment for MATerials (GREENMAT), University of Liège, Allée du Six Août 13, 4000 Liège, Belgium, (2) FRS ? FNRS, Rue d'Egmont 5, 1000 Bruxelles, Belgium, (3) Laboratoire de Physique du Solide, University of Namur, Rue de Bruxelles 61, 5000 Namur, Belgique, (4) Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB), University of Bordeaux, Avenue du Dr Albert Schweitzer 87, 33600 Pessac, France. * lead presenter
16:00	Characterisation studies of thermochromic VO2 thin films for smart windows applications Ayushi Rai1, Vidar Hansen1, Cristian N. Mihailescu2, and Andreas Delimitis1 1 Department of Mechanical and Structural Engineering and Materials Science, University of Stavanger, PO box 8600, N-4036 Stavanger, Norway 2 National Institute for Laser, Plasma and Radiation Physics, 409 Atomistilor Street, PO Box MG-36, 077125 Magurele, Romania	L P1.6	10:00 Spectrally Selective Electrochromic Devices: from Engineered Nanomaterials to Large Area Prototypes Cots, A. (1)*, Raho, R. (2)a, Dicorato, S. (2)b, Magni, M. (3), González, R.M. (1)c, Martínez, S. (1), Manca, M.(1) (1) LEITAT Technological Center, c/ de la Innovació, 2, 08225, Terrassa (Barcelona)- SPAIN, (2) IIT-CBN Istituto Italiano di Tecnologia- Center for Biomolecular Nanotechnologies, via Barsanti 14, 73010, Arnesano (Lecce)- ITALY, (3) Università degli Studi di Milano, Dipartimento di Chimica, via Golgi 19, Milano- ITALY, * lead presenter
16:00	Optical properties of laminar VO2-TiO2 nanocomposites: implication for thermochromic coatings Belenchuk, A.(1,2), Stroh, K.(3), Shapoval, O.(1,2), Vatavu, S.*(1) (1) Physics of Semiconductors and Devices Lab, Faculty of Physics and Engineering, Moldova State University, 60 A. Mateevici str., MD 2009, Chisinau, Moldova, (2) Solid State Structures Lab, Institute of Electronic Engineering and Nanotechnologies, 3/3 Academiei str., MD 2028, Chisinau, Moldova, (3) I. Institute of Physics, Georg-August University of Göttingen, Friedrich-Hund Platz 1, 37077 Göttingen, Germany	L P1.7	10:15 Development of composites based on metallic nanowires and functional oxides for energy-efficient smart windows A. Ambreen 1,2, A. Sekkat 1, D. Muñoz-Rojas1, D. Bellet 1, A. Rougier 2 1 Univ. Grenoble Alpes, CNRS, Grenoble INP, LMGP, 38000 Grenoble, France 2CNRS, Univ. Bordeaux, Bordeaux INP, ICMCB, UMR 5026, F-33600 Pessac, France
16:00	Chromogenic sensor for Candida spp. detection Ana-Maria IORDACHE1, Stefan-Marian IORDACHE1, *, Roxana BOHILTEA2, *, Valentin BARNA3, Constantin RIZEA4, Alexandra MAZLUM4, Valentina CAPATINA5, Cristiana Eugenia Ana GRIGORESCU1 1National Institute of R&D in Optoelectronics, INOE 2000, 409 Atomistilor, 077125, Magurele, Jud. Ilfov, Romania23 2Carol Davila» University of Medicine and Pharmacy Bucharest, 37 DionisieLupu, 020021, Bucharest, Romania 3University of Bucharest, Faculty of Physics,405 Atomistilor, P.O. Box MG-38, 077125, Magurele, Romania 4Roxxy Veterinary S.R.L.,52AUnirii Str.,Magurele, 077125, Romania 5MGM Star Construct S.R.L., 7B Pancota Str., Bucharest, Romania	L P1.8	10:30 Discussion
			V : Bernard Dam - Juris Purans
16:00	Dopants Concentrations and Mechanical Strength of the Promising Yb,Li:ZnWO4 Crystal Subbotin, K.A.(1,2), Titov, A.I.(1,2), Pavlov, S.K.(2,1), Volkov, P.A.(3), Sanina, V.V.(1), Lis, D.A.(1), Lis, O.N.(1), Kuleshova, K.V.(2), Didenko, Y.S.(2) & Zharikov, E.V.(1) (1)Prokhorov General Physics Institute of the Russian Academy of Sciences, Russia (2)Mendeleev University of Chemical Technology of Russia, Russia (3)NRC ?Kurchatov Institute? ? IREA Shared Knowledge Center, Russia	L P1.9	10:45 INV X-ray absorptions study of chromogenic materials Juris Purans Institute of Solid State Physics, University of Latvia, Kengaraga 8, LV-1063, Riga, Latvia
16:00	Dispersion of Principal Refractive Indices of Monoclinic MgWO4 Laser Host Crystal Subbotin, K.A.* (1, 2), Loiko, P.A. (3), Zimina, Y.I. (2), Kuleshova, K.V. (2), Didenko, Y.S. (2), Titov, A.I. (1,2) & Lis, D.A (1). (1)Prokhorov General Physics Institute, Russian Academy of Sciences, Russia (2) Mendeleev University of Chemical Technology of Russia, Russia (3)Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, France	L P1.10	11:15 Innovative Strategies of Colloidal Processing and Electronic Modulation of ITO Nanocrystals as NIR Plasmonic Electrochromics Maho, A.* (1), Saez Cabezas, C.A. (2), Gillissen, F. (1), Kim, D.K. (3), Heutz, S. (3), Milliron, D.J. (2), and Cloots, R. (1) (1) Group of Research in Energy and Environment for Materials (GREENMAT), University of Liège, B6a ? Agora, Allée du Six-Août 13, 4000 Liège, Belgium. (2) McKetta Department of Chemical Engineering, The University of Texas at Austin, Austin, Texas 78712, United States. (3) Department of Materials, Imperial College London, Prince Consort Road, SW7 2AZ London, United Kingdom. * lead presenter
			11:30 Origin of the memory effect in electrochromic WO3 thin films: crystallinity and stoichiometry issues B. Faceira*, L. Teule-Gay, A. Rougier Université de Bordeaux, CNRS, BxINP, UMR5026, F-33600 Pessac, France
			11:45 Discussion
			12:00 Lunch and Plenary

VI : Smagul Karazhanov –

- 15:15 INV Yttrium Oxyhydride (YHO) for Commercial Applications ? Challenges and Perspectives** L VI.1
Elbruz Murat Baba* 1-2 , Chang Chuan You 2, Erik Roenneberg 1, Smagul Karazhanov 2
1 Sunphade AS, Oslo, Norway, 2 Department for Solar Energy, Institute for Energy Technology (IFE), Kjeller, Norway
- 15:45 Modification of CeO₂ by doping for glass industry applications: ab-initio study** L VI.2
D. Mamedov, S. Zh. Karazhanov
1) Department for Solar Energy, Institute for Energy Technology, 2027 Kjeller, Norway 2) Department of Materials Science, National Research Nuclear University, 115409 Moscow, Russia, 1) Department for Solar Energy, Institute for Energy Technology, 2027 Kjeller, Norway 2) Department of Materials Science, National Research Nuclear University, 115409 Moscow, Russia
- 16:00 Oxygen-containing yttrium hydride and deuteride thin films: synthesis aspects together with optical and vibrational properties** L VI.3
M. Zubkins, I. Aulika, J. Gabrusenoks, E. Strods, V. Vibornijs, G. Chikvaidze, L. Bikse, A. Sarakovskis, H. Arslan, J. Purans
Institute of Solid State Physics, University of Latvia, Kengaraga 8, LV-1063, Riga, Latvia
- 16:15 New Lanthanide-free polyoxometalates as highly sensitive and reusable photoluminescent solid sensors for water detection** L VI.4
Aurély BAGGHI Philippe DENIARD H el ene SERIER-BRAULT R emi DESSAPT
Institut des mat eriaux Jean Rouxel (IMN), UMR 6502 CNRS, Universit e de Nantes, 2 rue de la Houssini ere, BP 32229, 44322 Nantes cedex 3, France
- 16:30 Fluorescent ion-imprinted polymers as sensing materials for lead detection** L VI.5
William Ren e, V eronique Lenoble, Katri Laatikainen, Catherine Branger
William REN E, Universit e de Toulon, MAPIEM Laboratory, France & Aix Marseille Universit e, CNRS, IRD, MIO, Toulon, France, V eronique LENOBLE, Aix Marseille Universit e, CNRS, IRD, MIO, Toulon, France, Katri LAATIKAINEN, Lappeenranta-Lahti University of Technology LUT, School of Engineering Science, Department of Separation Science, Lappeenranta, Finland, Catherine BRANGER, Universit e de Toulon, MAPIEM Laboratory, France
- 16:45 Discussion and Closing**