
Natacha KRINS
Maître de conférences
Sorbonne Université

CURRENT POSITION

Laboratoire Chimie de la Matière Condensée de Paris-LCMCP (Chemistry Dept) (Paris, France), Sorbonne Université, Paris

01/09/2014–present Associate Professor / Maître de conférences

PREVIOUS POSITIONS

Collège de France (Paris, France)

01/01/2014–31/08/2014 Post-doc (Mobility from Belgian Science Foundation, FRS-FNRS)
(C. Laberty-Robert)

University of Liège (Liège, Belgium)

16/11/2013-31/12/2013 Post-doc from Belgian Science Foundation, FRS-FNRS (R. Cloots)

Lawrence Berkeley National Laboratory, LBNL (CA, USA)

01/01/2011–15/11/2013 Post-doc (Mobility from Belgian Science Foundation, FRS-FNRS)
- at Molecular Foundry (D. J. Milliron)
- at Battery Group (T. J. Richardson and J. Cabana)

University of Liège (Liège, Belgium)

15/11/2010-31/12/2010 Post-doc - Teaching grant Université de Liège, Chemistry Dpt. (R. Cloots)

Collège de France (Paris, France)

01/01/2010–14/11/2010 Post-doc (Mobility from Université de Liège, Teaching grant)
(D. Grosso, C. Sanchez)

University of Liège (Liège, Belgium)

15/10/2009-31/12/2009 Post-doc Teaching grant Université de Liège, Chemistry Dpt (R. Cloots)

EDUCATION

Ph.D. Materials Science, University of Liège, Belgium, October 2009

Comp. M.S. Materials Science, University of Liège, Belgium, June 2006

M.S. Chemistry, University of Liège, Belgium, June 2004

SCIENTIFIC COMMUNICATION

Publications: **23 papers** (detailed list below)

International Meetings/Workshops: **11 talks (including 3 invited) + 9 posters** as 1st presenter

Patent application. FR1751950 deposited on March 10, 2017. "MEMBRANE COMPOSITE ET PROCÉDÉ DE FABRICATION D'UNE TELLE MEMBRANE", Maturation Program WINDLASS about "liquid-solid membrane" with SATT LUTECH.

MENTORING ACTIVITIES

Mentor of 1 PhD student: Olivier Nguyen, Start in Nov. 2015, LCMCP, France and 2 master students Antoine Deswazière (2017), Alexandre Fossati (2015)

Co-mentor of 2 first year PhD students: Sébastien Caes, 2009, ULg, LCIS-GreenMAat, Belgium ; Gary Ong, 2013, LBNL-MF, USA

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

Since 2018: DIM Respire, since 2015: French Hub RS2E, since 2014: LabEx Matisse

MAJOR COLLABORATIONS

- Since 2016:** A. Antkowiak and P. Grandgeorge (Institut d'Alembert-UPMC); 2D Membrane
- Since 2016:** O. Sel., H. Perrot (LISE-UPMC); Understanding Transport in photorechargeable batteries
- Since 2014:** C. Laberty-Robert (LCMCP-UPMC, France); Electrospun Hybrid membranes
- Since 2011:** D. J. Milliron, R. Buonsanti (Molecular Foundry, LBNL, CA-USA); T. Richardson, J. Cabana (BATT group, LBNL, CA-USA), Li-battery, LTO and TiO₂ nanoparticles synthesis
- Since 2008:** D. Grosso, C. Sanchez (LCMCP-Collège de France, France); TiO₂ sol-gel mesoporous film from water, ZnO nanocrystals in SiO₂ mesoporous matrix
- Since 2004:** R. Cloots, B. Vertruyen (ULg, Liège, Belgium); Li-batteries, Electrochromics, tungsten, niobium, vanadium-based mesoporous films

FELLOWSHIPS AND AWARDS

- 2017:** Best oral presentation Sol-gel 2017
- 2015:** Prix Louis d'or, Prix quinquennal des sciences Chimiques de la Société Royale des Sciences de Liège et du patrimoine de l'Université de Liège (Belgium).
- 2014:** Edith Flanigen Award from the Collaborative Research Center (CRC) Understanding of Metal Oxide / Water Systems at the Molecular Scale: Structural Evolution, Interfaces, and Dissolution, for Outstanding Young Female for her work in metal oxide.
- 2011-2012:** 2 year-postdoctoral fellowship at Lawrence Berkeley National Laboratory – USA, from WBI-World International (BE).
- 2011:** Fulbright Visiting Grant, for a postdoc at Lawrence Berkeley National Laboratory, CA (USA).
- 2011:** 4 year-postdoctoral fellowship from Belgian Science Foundation (FRS-FNRS).
- 2006:** European Materials Research Society Young Scientist Award (E-MRS 2006 Spring Meeting at Nice, FR).
- 2004:** 4-year PhD student fellowship from Belgian Science Foundation (FRS-FNRS).
- 2004:** Best Master's thesis in ULg (Liège, BE) from Belgian Royal Society of Chemistry;
Best Master's thesis in Wallonia (BE) from Belgian Royal Society of Chemistry;
Best student in Chemistry from the Association of the Chemists of ULg

INVITED PRESENTATIONS

- Sept. 2015:** 2 lectures at the Summer School on "Strategies for the synthesis and the characterization of metal oxides" organized by the Collaborative Research Center 1109, Humboldt University, Berlin, Germany.
- Sept. 2014:** Final Lecture of the Collaborative Research Center 1109 Workshop as the awardee of the Edith Flanigen Award, Humboldt University, Berlin, Germany.
- Oct. 2012:** **N. Krins**, R. Buonsanti, T. J. Richardson, B. A. Helms & D. J. Milliron : *Use colloidal nanocrystals for Li ion battery on the way to 3D architected electrodes*. Foundry Annual User Meeting of LBNL, Berkeley (USA).

PUBLICATIONS

1. O. Nguyen, **N. Krins**, C. Laberty-Robert, Harvesting light with semiconductor: Role of interface in the processes of charge transfer, **Materials Science in Semiconductor Processing** 73 (2018) 2–12.
2. I. Ressam, **N. Krins**, C. Laberty-Robert, M. Selmane, M. Lahcini, M. Raihane, A. El Kadib, H. Perrot and O. Sel, Sulfonic Acid Functionalized Chitosan as a Sustainable Component for Proton Conductivity Management in PEMs, **ChemistrySelect** 2 (8) (2017) 2503-2511.
3. O. Nguyen, E. Courtin, F. Sauvage, N. Krins, C. Sanchez, C. Laberty-Robert, Shedding light on the light-driven lithium ion de-insertion reaction: towards the design of a photo-rechargeable battery, **Journal of Materials Chemistry A**, 5 (2017) 5927-5933.
4. G. Lancel, P. Stevens, G. Toussaint, M. Maréchal, **N. Krins**, D. Bregiroux, and C. Laberty-Robert, Hybrid Li Ion Conducting Membrane as Protection for the Li Anode in an Aqueous Li–Air Battery: Coupling Sol–Gel Chemistry and Electrospinning, *Langmuir*, 33 (2017) 9288–9297.
5. D. Chatzikiyriakoua, **N. Krins**, B. Gilbert, P. Colson, J. Dewalque, J. Denayer, R. Cloots and C. Henrist, Mesoporous amorphous tungsten oxide electrochromic films: a Raman analysis of their good switching behavior, **Electrochimica Acta** 137 (2014) 75–82.
6. M. Brisbois, **N. Krins**, R. P. Hermann, A. Schrijnemakers, R. Cloots, B. Vertruyena, F. Boschini, Spray-drying synthesis of Na₂FePO₄F/carbon powders for lithium-ion batteries, **Materials Letters** 130 (2014) 263–266.
7. S. Caes, J. C. Arrebola, **N. Krins**, P. Eloy, E Gaigneaux, C. Henrist, R. Cloots and B. Vertruyen Mesoporous Lithium Vanadium Oxide as Thin Film Electrode for Lithium-Ion Batteries : Comparison between Direct Synthesis of LiV₂O₅ and Electrochemical Lithium Intercalation in V₂O₅, **J. Mater. Chem. A**, 2014, DOI: 10.1039/C4TA00090K
8. J. Dewalque, N. D. Nguyen, P. Colson, **N. Krins**, R. Cloots, C. Henrist, Stability of templated and nanoparticles dye-sensitized solar cells: photovoltaic and electrochemical investigation of degradation mechanisms at the photoelectrode interface, **Electrochimica Acta** 115 (2014) 478-486.
9. S. Caes, C. Malherbe, **N. Krins**, J.-C. Arrebola, C. Henrist, R. Cloots and B. Vertruyen, Lithium transition metal (Ti, Nb, V) oxide mesoporous thin films : contrasting results when attempting direct synthesis by evaporation-induced self-assembly, **Microporous and Mesoporous Materials**, 172 (2013) 87-94.
10. C. Jamin, K. Traina, D. Eskenazi, **N. Krins**, R. Cloots, B. Vertruyen and Boschini F., Effect of freeze-drying and self-ignition process on the microstructural and electrochemical properties of Li₄Ti₅O₁₂, **Materials Research Bulletin** 48 (2013) 4641-4646.
11. R. Buonsanti, **N. Krins**, T. E. Pick, T. J. Richardson, B. Helms and D.J. Milliron, Assembly of Ligand-Stripped Nanocrystals into Precisely Controlled Mesoporous Architectures, **Nano Letters** 12 (2012) 3872-3877.
12. J. Dewalque, R. Cloots, O. Dubreuil, **N. Krins**, B. Vertruyen and C. Henrist, Microstructural evolution of a TiO₂ mesoporous single layer film under calcination: Effect of stabilization and repeated thermal treatments on the film crystallization and surface area **Thin Solid Films** 520 (2012) 5272-5276.
13. **N. Krins**, J. D. Bass, D. Grosso, C. Henrist, R. Delaigle, E. M. Gaigneaux, R. Cloots, B. Vertruyen and C. Sanchez, NbVO₅ Mesoporous Thin Films by Evaporation Induced Micelles Packing: Pore Size Dependence of the Mechanical Stability upon Thermal Treatment and Li Insertion/Extraction, **Chem. Mater.** 23 (2011) 4124–4131.
14. J. Dewalque, R. Cloots, F. Mathis, O. Dubreuil, **N. Krins** and C. Henrist, TiO₂ multilayer thick films (up to 4 mm) with ordered mesoporosity: influence of template on the film mesostructure and use as high efficiency photoelectrode in DSSCs, **J. Mater. Chem.** 21 (2011) 7356-7363.
15. B. Louis, **N. Krins**, M. Faustini and D. Grosso, Understanding Crystallization of Anatase into Binary SiO₂/TiO₂ Sol-Gel Optical Thin Films: An in Situ Thermal Ellipsometry Analysis, **J. Phys. Chem. C** 115 (2011) 115, 3115–3122.
16. M. Faustini, B. Marmiroli, L. Malfatti, B. Louis, **N. Krins**, P. Falcaro, G. Greci, C. Laberty-Robert, H. Amenitsch, P. Innocenzic and D. Grosso, Direct nano-in-micropatterning of TiO₂ thin layers and TiO₂/Pt nanoelectrode arrays by deep X-ray lithography, **J. Mater. Chem.** 21 (2011) 3597-3603.
17. **N. Krins**, M. Faustini, B. Louis and D. Grosso, Thick and crack-free nanocrystalline mesoporous TiO₂ films obtained by capillary coating from aqueous solutions, **Chem. Mater.** 2010, 22, 6218–6220.

18. **N. Krins**, J. D. Bass, B. Julián-López, B P. Evrar, C. Boissière, L. Nicole, C. Sanchez, H. Amenitsch and D. Grosso, Mesoporous SiO₂ thin films containing ZnO photoluminescent nanoparticles. Simultaneous SAXS / WAXS / Ellipsometry investigations, **J. Mater. Chem.** 21 (2011) 1139–1146.
19. T. Ivanova, A. Harizanova, T. Koutzarova, **N. Krins**, B. Vertruyen, Electrochromic TiO₂, ZrO₂ and TiO₂-ZrO₂ thin films by dip-coating method, **Materials Science & Engineering B**, 165 (2009) 212–216.
20. Namur, O., Hatert, F., Grandjean, F., Long, G.J., **N. Krins**, Fransolet, A.-M., Auwera, J.V., Charlier, B. Ti substitution mechanisms in phlogopites from the Suwalki massif-type anorthosite, NE Poland, **European Journal of Mineralogy** 21 (2009), 21 (2) 397-406.
21. **N. Krins**, L. Lepot, R. Cloots and B. Vertruyen, Structural and electrochemical characterization of mesoporous thin films of Nb_{2x}V_{2-2x}O₅ upon lithium intercalation, **Solid State Ionics** 180 (2009) 848–852.
22. **N. Krins**, A. Rulmont, J. Grandjean, B. Gilbert, L. Lepot, R. Cloots, B. Vertruyen, Structural and electrical properties of tellurovanadate glasses containing Li₂O, **Solid State Ionics** 177 (2006) 3, 147-150.
23. **N. Krins**, F. Hatert, K. Traina, L. Dusoulier, I. Molenberg, J.F. Fagnard, Ph. Vanderbemden, A. Rulmont, R. Cloots, B. Vertruyen, LiMn_{2-x}Ti_xO₄ spinel-type compound (x≤1) : Structural, electrical and magnetic properties, **Solid State Ionics** 177 (2006) 1033-1040.