

Dr Quentin BERROD

Research Scientist - CNRS

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CEA – INAC – SyMMES

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French 

Personal website

Physico-chemist

Specialty: soft matter - electrolytes – confinement – multi-scale dynamics

EDUCATION

- 2010 - 2013** [PhD](#) in Physics, CEA / SPram and ILL (Grenoble, France). Supervisor: S. Lyonnard
Structure - transport interplay in membranes and model systems for fuel cells electrolytes
- 2009 - 2010** Master degree: Polymer for Advanced Technologies – Grenoble University (head of the class)
- 2004 - 2007** Bachelor degree in Physics and Chemistry (Grenoble University, France, rank: 2/51)

POSITIONS

- 2018 - present** CNRS research scientist, SyMMES – Instrument scientist at ILL: IN6/Sharp spectrometer
- 2017 - 2018** Instrument scientist. CRG ILL / LLB - IN6/SHARP: *Time-of-Flight spectrometer co-responsible*
- 2016 - 2017** Postdoc at Berkeley Lab (LBNL, USA) and LLB (Paris, France): Eurotalents Fellowship
High power carbon nanotube based 1D battery
- 2014 - 2016** Postdoc at LLB (Paris, France): *Ionic liquids confined in carbon nanotubes membranes*

RESEARCH EXPERTISE

- Research area** Nanostructured materials: Self-assembled surfactants, Ionic liquids, Carbon nanotubes, Polymer membranes. Electrolytes: Fuel Cells and Batteries. Confinement. Multi-scale dynamics and transport properties.
- Main techniques** Small Angle Scattering (**SANS - SAXS**) Quasi-elastic Neutron Scattering (**QENS**)
- Other techniques** PFG-NMR, XRD, Impedance spectroscopy, Galvanostatic cycling, IR, DSC, TGA

TEACHING EXPERIENCE

- 2010 - 2013** Lab classes in analytical, inorganic and thermo- chemistry – 128 h
Courses/tutorial classes in atomistic – 64 h
- 2013** Organization of a 3 days training course for PhD students, awareness campaign of student's uneasiness and handicap
- 2012** Science Festival, Valence, France: set up and realization of physico-chemical experiments

SUPERVISION / REVIEWING EXPERIENCE

- 2017** Referee for neutron beam time allocation at ANSTO (Australia)
- 2017** Referee for OPUS funding of the National Science Center (Poland)
- 2014 - 2015** PhD student, 1.5 year, from Pierre et Marie Curie University, France
- 2013** Master student, 2 months, from Tohoku University, Japan

GRANTS

- 2018** Application for an ERC-Starting grant: Conduction exalted by nanopipe confinement
- 2016 - 2017** Marie-Curie [Eurotalents](#) fellowship, 16 months, Lawrence Berkeley National Laboratory (Berkeley, CA, USA) & LLB (Saclay, France)
- 2014** French Australia Science Innovation Collaboration [PHC FASIC](#) - 9 k€.

PUBLICATIONS – PATENT

(*: main publications)

- (1) 2018 Q. Berrod et al., *Inelastic and Quasi-Elastic Neutron Scattering. Application to Soft-Matter*, **EPJ Conferences**, **188**, 05001
- (2)* 2017 Q. Berrod, et al., *Ionic liquids charged with lithium salt confined in 1D CNT membranes: giant ionic conductivity*, [arXiv 1710.06020](https://arxiv.org/abs/1710.06020)
- (3) 2017 N. Martinez, A. Morin, Q. Berrod, et al., *Multi-scale water dynamics in PEM Fuel Cell by operando Quasi Elastic Neutron Scattering*, **JPC C**, **122**, 2, 1103-1108
- (4)* 2017 Q. Berrod, et al., *Water sub-diffusion in membranes for fuel cells*, **Sci. Rep.**, **7**, 8326
- (5)* 2017 F. Ferdeghini[°], Q. Berrod[°], et al., *Nanostructuring of ionic liquids: impact on the cation mobility. A multiscale study*, **Nanoscale**, **9**, 1901-1908. (°: equal contribution)
- (6)* 2017 Q. Berrod[°], et al., *Ionic Liquids: evidence of the viscosity scale-dependence*, **Sci. Rep.**, **7**, 2241
- (7) 2017 S. Mitra, C. Cerclier, Q. Berrod et al., *Ionic Liquids Confined in Silica Ionogels: Structural, Thermal and Dynamical Behaviors*, **Entropy**, **19** (4), 140
- (8)* 2016 Q. Berrod, et al., *Enhanced ionic liquid mobility induced by confinement in 1D CNT membranes*, **Nanoscale**, **8**(15), 7845-7848.
- (9) Patent 2016 Q. Berrod, F. Ferdeghini, P. Judeinstein, J. Dijon, J.M. Zanotti, *Nanocomposite membranes for electrochemical devices and desalination* (FR1552572 – **WO2016151142**)
- (10)* 2015 Q. Berrod et al., *Nanostructure and transport properties of proton conducting self-assembled perfluorinated surfactants: a bottom-up approach towards PFSA fuel cell membranes*, **Macromolecules**, **48** (17), 6166–6176
- (11) 2015 Q. Berrod, et al., *QENS investigation of proton confined motions in hydrated perfluorinated sulfonic membranes and self-assembled surfactants*, **EPJ** **83**, 02002
- (12) 2015 M. Fumagalli, S. Lyonnard, G. Prajapati, Q. Berrod, et al., *Fast Water Diffusion and Long-Term Polymer Relaxations During Nafion Membrane Hydration Evidenced by Time-Resolved SANS*, **J. Phys. Chem. B**, **119** (23), 7068–707
- (13) 2014 S. Dalla Bernardina, J.B. Brubach, Q. Berrod, et al., *On the Mechanism of Ionization, Hydration and Intermolecular H-Bonding in Proton Conducting Nanostructured Ionomers*, **J. Phys. Chem. C**, **118**(44), 25468-25479
- (14) 2010 S. Lyonnard, Q. Berrod, et al., *Perfluorinated surfactants as model charged systems for understanding the effect of confinement on proton transport and water mobility in fuel cells membranes. A study by QENS*, **EPJ**, **189**, 205-216

CONFERENCES AND COURSES

Nov. 2018	Matériaux 2018, Strasbourg, France		Talk
Oct. 2018	Workshop on Neutron Spin Echo – Grenoble, France	- Invited -	Talk
Dec. 2017	HZB Science Day – Berlin, Germany	- Invited -	Talk
May 2016	EMN Meeting on Fuel Cells – Jeju, South Korea	- Invited -	Talk
May 2014	QENS conference – Autrans, France		Talk
Jun. 2013	<i>Journées de la Diffusion Neutronique</i> (JDN 21) – Sète, France		Talk
Apr. 2013	Fundamentals & Development for Fuel Cells conference (FDFC) – Karlsruhe, Germany		Talk
Oct. 2012	QENS conference – Nikko, Japan		Talk
Sep. 2012	Solid State Proton Conductors conference (SSPC) - Grenoble, France		Poster
Jun. 2012	<i>Groupe de Recherche conference (GdR-PACS)</i> – Belfort, France		Talk
Apr. 2012	HERCULES school – Grenoble, France		Poster
Jun. 2011	<i>Journées de la Diffusion Neutronique</i> (JDN 19) – Batz-sur-mer, France		Poster Talk
Feb. 2011	ESRF User's meeting – Grenoble, France		Poster

OTHERS

Computer skills	Advanced: Office package, Latex. Basic: Matlab. IDL, Python
Languages	French: Native English: Fluent German: To reactivate
References	Sandrine.lyonnard@cea.fr, Jmzanotti@cea.fr, VSBattaglia@lbl.gov Gerard.gebel@cea.fr, christiane.alba-simionesco@cea.fr