Curriculum Vitae

ANNA LLORDÉS GIL

Date: June 2013
Nationality: Spanish
E-mail: allordes@lbl.gov; anllordes@gmail.com

Qualifications

PhD in Chemistry-Materials Science by "Universitat Autònoma de Barcelona" Spain, May 2010.

Master in Chemical Experimentation by "Universitat Autònoma de Barcelona" Spain, 2004.

Certificate of Pedagogical Aptitude in Chemistry and Physics by "Universitat Autònoma de Barcelona" Spain, 2003.

B. Sc. degree in Chemistry by "Universitat Autònoma de Barcelona" Spain, 2002.

Languages

Catalan and Spanish: Mother tongue.
English: Advanced level
French: Intermediate level
German: Beginner level

Research Experience

May 2013-present

Project Scientist at Lawrence Berkeley National Laboratory. The Molecular Foundry, Material Science Division.

PI: Delia Milliron

New chemical approaches to synthesize metal oxide composite materials with mesostructural control and tunable electrochemical properties. The role of interfaces and mesoscale order in ion transport enhancement.

June 2010-April 2013

Postdoctoral Fellow at Lawrence Berkeley National Laboratory. The Molecular Foundry Material Science Division.

Advisor: Delia Milliron

Synthesis of nanocrystal-in-glass metal oxide materials with tunable electrochromic properties. The role of interfaces in the glass reconstruction and consequent enhanced electrochromic properties.

January 2006-May 2010

PhD student at the Materials Science Istitute of Barcelona, (ICMAB-CSIC), Spain. Superconducting Materials and Large Scale Nanostructuring Department.

Advisor: Prof. Xavier Obradors and Dr.Susagna Ricart

High current superconducting $YBa_2Cu_3O_7$ epitaxial films with embedded insulating nanocrystals: synthesis by chemical methods and control of interfacial strain to tune transport properties.

June-Ago. 2008 and 2009 Visiting PhD student at the CRISMAT Research Center, Crystallography Department, Caen, France.

Advisor: Prof.Daniel Chateigner

X-Ray diffraction techniques to study interface reconstructions in epitaxial nanocomposite thin films: quantification of lattice strain, strain anisotropy and texture.

Jun. 2007-Oct.2007 Visiting PhD student at Hasselt University, Inorganic and Physical Chemistry Group,. Belgium.

Advisors: Prof. M.K. van Bael and Dr. An Hardy

Evolved gas analysis of hybrid metal-organic materials: thermal evolution to metal oxides.

Sep. 2004- Sep. 2005 Granted student from the "Consejo Superior de Investigaciones Científicas (CSIC)". Organic Materials Department of the "Institut de Ciència de Materials de Barcelona (ICMAB)", Spain.

Advisor: Dr. Susagna Ricart

Synthesis of new polymetallic carbene complexes.

Feb. 2002-Jul. 2002 Granted undergrad student from the ERASMUS program of the European Union. Materials Department of the University of Twente. Enschede, Holland.

Referee: Dr.Nabeel Jarrah

Synthesis of Pd-catalyst supported on carbon nanofibers.

Relevant scientific techniques and skills acquired

Synthesis and manipulation of air sensitive materials using Schlenk line and glove box.

Synthesis of metal oxide nanocrystals and clusters: colloidal and polyoxometalate chemistry.

Synthesis of nanocomposite materials: surface chemistry, solution and solid state chemistry.

Chemical Solution Deposition Methodologies.

Electrochemical characterization techniques: spectro-electrochemistry, cyclic voltammetry, chronopotentiometry, electrochemical impedance spectroscopy.

Structural characterization with X-Ray scattering techniques: texture/strain analysis, pole figures, grazing incidence small/wide Angle X-ray scattering with synchrotron sources, Rietveld refinement (MAUD software and FullProf).

Morphological and structural characterization: Transmission Electron Microscopy (TEM), Field-Emission Scanning Electron Microscopy ((FE)SEM), Profilometer.

Evolved gas analysis techniques: thermogravimetry coupled to mass spectrometry (MS).

Nuclear magnetic resonance (NMR) Spectroscopy: ^{1}H NMR and ^{13}C NMR .

Optical spectroscopy: UV-Vis, FTIR.

Raman spectroscopy.

X-Ray absorption spectroscopy, X-ray photoelectron spectroscopy.

Papers

1. D.J. Milliron, R. Buonsanti, A. Llordes and B.A. Helms, Constructing Functional Mesostructured Materials from Colloidal Nanocrystal Building Blocks. *Submitted.*

2. L. De Trizio, R. Buonsanti, A.M. Schimpf, A. Llordes, D.R. Gamelin, R.Simonutti[1], and D. J. Milliron, Nb-Doped Colloidal TiO_2 Nanocrystals with Tunable Infrared Absorption. *Submitted.*

3. A. Llordes, G. Garcia, J. Gazquez, D. J. Milliron, Tunable transmittance of near infrared and visible light in a reconstructed nanocrystal-in-glass composite. *Nature*, in press.

4. G. Garcia, R. Buonsanti, A. Llordes, E. L. Runnerstrom, A. Bergerud, D. J. Milliron, Near-Infrared Spectrally Selective Plasmonic Electrochromic Thin Films. *Adv. Opt. Mater.* **1**, 215 (2013).

5. E. L. Rosen, R. Buonsanti, A. Llordes, A. M. Sawvel, D. J. Milliron, B. A. Helms, Exceptionally Mild Reactive Stripping of Native Ligands from Nanocrystal Surfaces by Using Meerwein's Salt. *Angew. Chem.-Int. Ed.* **51**, 684 (2012).

6. X. Obradors, F. Martinez-Julian, K. Zalamova, V. R. Vlad, A. Pomar, A. Palau, A. Llordes, H. Chen, M. Coll, S. Ricart, N. Mestres, X. Granados, T. Puig, M. Rikel, Nucleation and Mesostrain Influence on Percolating Critical Currents of Solution Derived $YBa_2Cu_3O_7$ Superconducting Thin Films. *Physica C-Superconductivity and Its Applications* **482**, 58 (2012).

7. A. Llordes, A. Palau, J. Gazquez, M. Coll, R. Vlad, A. Pomar, J. Arbiol, R. Guzman, S. Ye, V. Rouco, F. Sandiumenge, S. Ricart, T. Puig, M. Varela, D. Chateigner, J. Vanacken, J. Gutierrez, V. Moshchalkov, G. Deutscher, C. Magen, X. Obradors, Nanoscale Strain-Induced Pair Suppression as a Vortex-Pinning Mechanism in High-Temperature Superconductors. *Nature Materials* **11**, 329 (2012).

8. A. Palau, A. Llordes, M. Gibert, T. Puig, A. Pomar, X. Obradors, Pinning Landscape Analysis in YBCO Films with Epitaxial and/or Non-Coherent BZO Nanoparticles. *Ieee Transactions on Applied Superconductivity* **21**, 3243 (2011).

9. A. Palau, E. Bartolome, A. Llordes, T. Puig, X. Obradors, Isotropic and Anisotropic Pinning in Tfa-Grown $YBa_2Cu_3O_7$ Films with $BaZrO_3$ Nanoparticles. *Superconductor Science & Technology* **24**, (2011).

10. A. Llordes, A. T. Hammack, R. Buonsanti, R. Tangirala, S. Aloni, B. A. Helms, D. J. Milliron, Polyoxometalates and Colloidal Nanocrystals as Building Blocks for Metal Oxide Nanocomposite Films. *J. Mater. Chem.* **21**, 11631 (2011).

11. G. Garcia, R. Buonsanti, E. L. Runnerstrom, R. J. Mendelsberg, A. Llordes, A. Anders, T. J. Richardson, D. J. Milliron, Dynamically Modulating the Surface Plasmon Resonance of Doped Semiconductor Nanocrystals. *Nano Lett.* **11**, 4415 (2011).

12. R. Buonsanti, A. Llordes, S. Aloni, B. A. Helms, D. J. Milliron, Tunable Infrared Absorption and Visible Transparency of Colloidal Aluminum-Doped Zinc Oxide Nanocrystals. *Nano Lett.* **11**, 4706 (2011).

13. E. Bartolome, A. Palau, A. Llordes, M. Gibert, T. Puig, X. Obradors, Vortex Dynamics in Nanostructured TFA-Grown YBCO Films Studied by Ac Susceptibility. *Ieee Transactions on Applied Superconductivity* **21**, 3189 (2011).

14. A. Llordes, K. Zalamova, S. Ricart, A. Palau, A. Pomar, T. Puig, A. Hardy, M. K. Van Bael, X. Obradors, Evolution of Metal-Trifluoroacetate Precursors in the Thermal Decomposition toward High-Performance $YBa_2Cu_3O_7$ Superconducting Films. *Chem. Mater.* **22**, 1686 (2010).

15. E. Bartolome, A. Palau, A. Llordes, T. Puig, X. Obradors, Vortex Oscillations in Tfa-Grown YBCO Thin-Films with Bzo Nanoparticles. *Physica C-Superconductivity and Its Applications* **470**, 2033 (2010).

16. E. Bartolome, A. Palau, A. Llordes, T. Puig, X. Obradors, Vortex Dynamics at High Ac Amplitudes of Trifluoracetate Route Grown $YBa_2Cu_3O_7$-$BaZrO_3$ Nanocomposites. *Physical Review B* **81**, (2010).

17. E. Bartolome, A. Palau, A. Llordes, T. Puig, X. Obradors, Vortex Oscillations in Tfa-Grown Ybco Thin-Films with BZO Nanoparticles. *Physica C-Superconductivity and Its Applications* **470**, 2033 (2010).

18. A. Pomar, V. Roxana Vlad, A. Llordes, A. Palau, J. Gutierrez, S. Ricart, T. Puig, X. Obradors, A. Usoskin, Enhanced Vortex Pinning in YBCO Coated Conductors with Bzo Nanoparticles from Chemical Solution Deposition. *Ieee Transactions on Applied Superconductivity* **19**, 3258 (2009).

19. T. Puig, J. Gutierrez, A. Pomar, A. Llordes, J. Gazquez, S. Ricart, F. Sandiumenge, X. Obradors, Vortex Pinning in Chemical Solution Nanostructured YBCO Films. *Superconductor Science & Technology* **21**, (2008).

20. A. Pomar, A. Llordes, M. Gibert, S. Ricart, T. Puig, X. Obradors, Tuning the Superconducting Properties of $YBa_2Cu_3O_7$ Tapes Grown by Chemical Methods. *Physica C-Superconductivity and Its Applications* **460**, 1401 (2007).

21. J. Gutierrez*, A. Llordes*, J. Gazquez, M. Gibert, N. Roma, S. Ricart, A. Pomar, F. Sandiumenge, N. Mestres, T. Puig, X. Obradors, Strong Isotropic Flux Pinning in Solution-Derived $YBa_2Cu_3O_{7-x}$ Nanocomposite Superconductor Films. *Nature Materials* **6**, 367 (2007).

22. A. Artillo, G. Della Sala, M. De Santis, A. Llordes, S. Ricart, A. Spinella, Preparation of Organometallic Uracil-Analogue Fischer Carbene Complexes: Comparative Study of Conventional Heating Vs Microwave Irradiation. *J. Organomet. Chem.* **692**, 1277 (2007).

23. A. Llordes, M. A. Sierra, M. P. Lopez-Alberca, E. Molins, S. Ricart, Synthesis of New Polymetallic Carbene Complexes: Uracil Analogs. *J. Organomet. Chem.* **690**, 6096 (2005).

Books sections

- Puig, T.; Pomar, A.; Palau, A.; Gutiérrez, J.; Gibert, M.; Coll, M.; Llordés, A.; Gázquez, J.; Ricart, S.; Mestres, N.; Sandiumenge, F.; Obradors, X. In F*lux pinning and ac loss Studies on YBCO Coated Conductors;* Paranthaman, M. P., Selvanamickan, V., Eds.; Nova Science Publishers, Inc: New York, 2007, p 171-204.

Issued Patents

- *Nanostructured Superconductor Material of type $REBa_2Cu_3O_7$ (RE=rare earth or yttrium) with high density of vortex pinning centres and its preparation method.* X. Obradors, T. Puig, S. Ricart, A. Pomar, F. Sandiumenge, N. Mestres, A. Llordes, M. Gibert, J. Gutiérrez, J. Gázquez, N. Romá. # 20063172. **2007.**
- *Inorganic Nanocomposite and Method of Making Thereof.* DJ Milliron, R Tangirala, A Llordes. # US 20120273719. **2010.**

Pending Patent Applications

- *Nanocrystal-Polymer Nanocomposite Electrochromic Device.* D.J. Milliron, B.A. Helms, A. Llordes, R. Buonsanti, G. Garcia, E. Runnerstrom. US patent application 61/622,203. **2012**.
- *Electrochromic Nanocomposite Films.* DJ Milliron, A Llordes, R Buonsanti, G Garcia. US patent application 61/511,495. **2011**.
- *Nanostructured Transparent Conducting Oxide Electrochromic Device.* DJ Milliron, G Garcia, A Llordes, R Tangirala, R Buonsanti. US patent application 61/528,124. **2011.**

Contributions to Conferences: **Oral presentations**

- Llordés, A.; R. Buonsanti; Garcia, G., Gazquez, J. ; Milliron, D.J. "Preparation of Solution-Derived Metal Oxide Nanocomposite Films using Colloidal Nanocrystals and Polyoxometalates". In Materials Research Society (MRS) Spring Meeting 2012. San Francisco (USA).
- Llordés, A.; Garcia, G.; Hammack, A. T.; Buonsanti, R.; Cauvin, T.; Milliron, D. J. " Polyoxometalates and colloidal oxide nanocrystals as building blocks for solution-derived electrochromic nanocomposite films". In *European Materials Research Society (MRS) Fall Meeting 2011*. Warsaw (Poland).
- Llordés, A.; Tangirala, R.; Garcia, G.; Buonsanti, R.; Helms, B.A.; Dong, A; Milliron, D.J. "From colloidal nanocrystals to functional inorganic nanocomposite films". In *Materials Research Society (MRS) Spring Meeting 2011*. San Francisco (USA).
- Llordés, A; Tangirala, R.; Wang, R.; Garcia, G.; Buonsanti, R.; Milliron, D.J. "Preparation and Device Integration of Modular Inorganic Nanocomposites". In *Materials Research Society (MRS) Fall Meeting 2010*. Boston (USA).
- Llordés, A.; Gazquez, J.; Abellán, P.; Pomar, A.; Sandiumenge, F.; Ricart, S.; Puig, T.; Obradors, X. "Tuned Strain In Complex Oxide Nanocomposites Grown From Metal-Organic Solutions". In *Materials Research Society (MRS) Spring Meeting 2009*. San Francisco (USA).

- Llordés, A.; Martínez, F.; Abellán, P.; Pomar, A.; Sandiumenge, F.; Puig, T.; Obradors, X.; Ricart, S. "Nanoparticles in $YBa_2Cu_3O_{7-d}$ superconducting thin films". In *Trends in Nanotechnology - TNT 2008*. Oviedo (Spain).
- Llordés, A.; Gutiérrez, J.; Gázquez, J.; Martínez-Julián, F.; Pomar, A.; Abellán, P.; Gibert, M.; Romà, N.; Ricart, S.; Sandiumenge, F.; Mestres, N.; Puig, T.; Obradors, X. "High current $YBa_2Cu_3O_7$ -$BaZrO_3$ nanocomposites films by chemical deposition: influence of BZO content". In *Material challenges for future applications in energy and environment, XaRMAE*. December 2007. Barcelona.
- Llordés, A.; Gutiérrez, J.; Gázquez, J.; Gibert, M.; Martínez-Julián, F.; Romà, N.; Ricart, S.; Pomar, A.; Sandiumenge, F.; Mestres, N.; Puig, T.; Obradors, X. "High current YBCO nanocomposites grown by chemical solution deposition". In *Red española de nanoestructuración de materiales a gran escala*. December, 2007. Barcelona.
- Llordés, A.; Ricart, S.; Obradors, X.; Puig, T.; Roma, N.; Pomar, A. "Preparació de Capes Primes Superconductores de $YBa_2Cu_3O_7$ a partir de solucios metal·lòrganiques". In *IV Trobada de Joves Investigadors dels Paisos Catalans*. January, 2006. Lleida (Spain).

Schools and courses:

- *6th Annual SSRL School on Synchrotron X-Ray Scattering Techniques in Materials and Environmental Sciences: Theory and Application*, SLAC National Accelerator Laboratory, May 29-31 2012, , Stanford (US).
- T*ransmission Electron Microscopy Training Course,* NESPA (NanoEngineered Superconductors for Power Applications), 12-15 May 2009, Serveis Cientifico Tècnics. Barcelona (Spain)
- *From Micro to Macro: microstructural and texture analysis from diffraction data*, Lectures by:Daniel Chateigner and Luca Lutterotti, 26-30 January 2009, Università degli Studi di Milano (Italy).
- *X-ray Diffraction Applications to Material Science*, Institut deCiència de Materials de Barcelona, 24 November 2008, Bellaterra (Spain).
- *School on Superconducting Materials and Applications*, The European Network for Superconductivity (SCENET), 18-30 July 2005, Turku (Finland).