Curriculum Vitae

# ANNA LLORDES GIL

**Date:** January 2012
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## 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

June 2010-present

**Study of Metal Oxide-based Materials as Electrodes and Solid Electrolytes in Nanocomposite Electrochromic Films.**

Postdoctoral Fellow at Lawrence Berkeley National Laboratory. Material Science Division.

Advisor: Dr. D.J. Milliron, director of the Inorganic Nanostructures Department at the Molecular Foundry.

January 2006-May 2010

**High Current Superconducting Thin Film Nanocomposites by Chemical Methods.**

Granted PhD student from the "Consejo Superior de Investigaciones Científicas (CSIC)". Superconducting Materials and Large Scale Nanostructuring Department.

Referee: Prof. Xavier Obradors and Dr.Susagna Ricart

June-Ago. 2008 and 2009

**X-ray Diffraction Techniques: Study of Microstructure and Texture in Nanocomposite Thin Films.**

Visiting PhD student at the CRISMAT Research Center, Crystallography Department, Caen, France.

Referee: Prof.Daniel Chateigner

Jun. 2007-Oct.2007

**Evolved Gas Analysis of Metal-Trifluoroacetates.**

Visiting PhD student at Hasselt University, Inorganic and Physical Chemistry Group,. Belgium.

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

Sep. 2004- Sep. 2005 **Synthesis of new polymetallic carbene complexes.**

Granted student from the "Consejo Superior de Investigaciones Científicas (CSIC)". Organic Materials Department of the "Institut de Ciència de Materials de Barcelona (ICMAB)", Spain. Referee: Dr. Susagna Ricart

Feb. 2002-Jul. 2002 **Preparation of Pd-catalyst supported on carbon nanofibers.**

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

Referee: Dr.Nabeel Jarrah

## Relevant scientific techniques and skills acquired

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

Synthesis of metal oxide nanocrystals: colloidal techniques.

Nanocrystals charge/discharge through electrochemical doping

Thin Film Preparation: Chemical Solution Deposition of binary and ternary oxides: thin films and nanocomposite thin films.

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

Structural characterization using X-Ray Diffraction (XRD): conventional XRD with 0D detector and 1D detector (position sensitive detector). 2D-detector (GADDS), High-resolution-XRD. Four circle-goniometer. Rietveld methodologies (MAUD software and FullProf) to evaluate texture, microstructure and strain.

Experience in Synchrotron X-ray sources: Grazing Incidence Small/Wide Angle X-Ray Scattering techniques.

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) and Fourier Transform Infrared Spectroscopy (FTIR)

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

X-Ray Photoelectron Spectroscopy.

Rutherford Backscattering Spectroscopy.

Optical Spectroscopy: UV-Vis, FT-IR

## Papers

1. Llordes, A.; Palau, A.; Gázquez, J.; Coll, M.; Vlad, R.; Pomar, A.; Arbiol, J.; Guzmán, R.; Ye, S.; Rouco, V.; Sandiumenge, F.; Ricart, S.; Puig, T.; Varela, M.; Chateigner, D.; Vanacken, J.; Gutiérrez, J.; Moshchalkov, V.; Deutscher, G.; Magen, C.; Obradors, X. "Nanoscale strain-induced pair suppression as a vortex pinning mechanism in high-temperature superconductors" *Nature Materials. In press.*
2. Rosen, E. L.; Buonsanti, R.; Llordes, A.; Sawvel, A. M.; Milliron, D. J.; Helms, B. A., Exceptionally Mild Reactive Stripping of Native Ligands from Nanocrystal Surfaces by Using Meerwein's Salt. *Angewandte Chemie International Edition* **2011**. DOI: 10.1002/anie.201105996.

3. Palau, A.; Llordes, A.; Gibert, M.; Puig, T.; Pomar, A.; Obradors, X., Pinning Landscape Analysis in YBCO Films With Epitaxial and/or Non-Coherent BZO Nanoparticles. *Ieee T Appl Supercon* **2011,** *21* (3), 3243-3246.

4. Palau, A.; Bartolome, E.; Llordes, A.; Puig, T.; Obradors, X., Isotropic and anisotropic pinning in TFA-grown YBa(2)Cu(3)O(7-x) films with BaZrO(3) nanoparticles. *Supercond Sci Tech* **2011,** *24* (12).

5. Llordes, A.; Hammack, A. T.; Buonsanti, R.; Tangirala, R.; Aloni, S.; Helms, B. A.; Milliron, D. J., Polyoxometalates and colloidal nanocrystals as building blocks for metal oxide nanocomposite films. *Journal of Materials Chemistry* **2011,** *21* (31), 11631-11638.

6. Garcia, G.; Buonsanti, R.; Runnerstrom, E. L.; Mendelsberg, R. J.; Llordes, A.; Anders, A.; Richardson, T. J.; Milliron, D. J., Dynamically Modulating the Surface Plasmon Resonance of Doped Semiconductor Nanocrystals. *Nano Letters* **2011,** *11* (10), 4415-4420.

7. Buonsanti, R.; Llordes, A.; Aloni, S.; Helms, B. A.; Milliron, D. J., Tunable Infrared Absorption and Visible Transparency of Colloidal Aluminum-Doped Zinc Oxide Nanocrystals. *Nano Letters* **2011,** *11* (11), 4706-4710.

8. Bartolome, E.; Palau, A.; Llordes, A.; Gibert, M.; Puig, T.; Obradors, X., Vortex Dynamics in Nanostructured TFA-Grown YBCO Films Studied by Ac Susceptibility. *Ieee T Appl Supercon* **2011,** *21* (3), 3189-3191.

9. Llordes, A.; Zalamova, K.; Ricart, S.; Palau, A.; Pomar, A.; Puig, T.; Hardy, A.; Van Bael, M. K.; Obradors, X., Evolution of Metal-Trifluoroacetate Precursors in the Thermal Decomposition toward High-Performance YBa(2)Cu(3)O(7) Superconducting Films. *Chemistry of Materials* **2010,** *22* (5), 1686-1694.

10. Bartolome, E.; Palau, A.; Llordes, A.; Puig, T.; Obradors, X., Vortex dynamics at high ac amplitudes of trifluoracetate route grown YBa(2)Cu(3)O(7-x)-BaZrO(3) nanocomposites. *Physical Review B* **2010,** *81* (18).

11. Bartolome, E.; Palau, A.; Llordes, A.; Puig, T.; Obradors, X., Vortex oscillations in TFA-grown YBCO thin-films with BZO nanoparticles. *Physica C* **2010,** *470* (22), 2033-2039.

12. Pomar, A.; Vlad, V. R.; Llordes, A.; Palau, A.; Gutierrez, J.; Ricart, S.; Puig, T.; Obradors, X.; Usoskin, A., Enhanced Vortex Pinning in YBCO Coated Conductors With BZO Nanoparticles From Chemical Solution Deposition. *Ieee T Appl Supercon* **2009,** *19* (3), 3258-3261.

13. Puig, T.; Gutierrez, J.; Pomar, A.; Llordes, A.; Gazquez, J.; Ricart, S.; Sandiumenge, F.; Obradors, X., Vortex pinning in chemical solution nanostructured YBCO films. *Supercond Sci Tech* **2008,** *21* (3).

14. Pomar, A.; Llordes, A.; Gibert, M.; Ricart, S.; Puig, T.; Obradors, X., Tuning the superconducting properties of YBa2Cu3O7 tapes grown by chemical methods. *Physica C* **2007,** *460*, 1401-1404.

15. Llordes, A.; Gutierrez, J; Gazquez, J.; Gibert, M.; Roma, N.; Ricart, S.; Pomar, A.; Sandiumenge, F.; Mestres, N.; Puig, T.; Obradors, X., Strong isotropic flux pinning in solution-derived YBa2Cu3O7-x nanocomposite superconductor films. *Nature. Materials.* **2007,** *6* (5), 367-373.

16. Artillo, A.; Della Sala, G.; De Santis, M.; Llordes, A.; Ricart, S.; Spinella, A., Preparation of organometallic uracil-analogue Fischer carbene complexes: Comparative study of conventional heating vs microwave irradiation. *J Organomet Chem* **2007,** *692* (6), 1277-1284.

17. Llordes, A.; Sierra, M. A.; Lopez-Alberca, M. P.; Molins, E.; Ricart, S., Synthesis of new polymetallic carbene complexes: Uracil analogs. *J Organomet Chem* **2005,** *690* (24-25), 6096-6100.

## 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.* Obradors, X.; Puig, T.; Ricart, S.; Pomar, A.; Sandiumenge, F.; Mestres, N.; Llordés, A.; Gibert, M.; Gutiérrez, J.; Gázquez, J.; Romá, N.s. Nº 20063172. **2007.**

## Pending Patent Applications

1. DJ Milliron, G Garcia, A Llordes, R Tangirala, R Buonsanti, "Nanostructured transparent conducting oxide electrochromic device," **2011.**
2. DJ Milliron, A Llordes, R Buonsanti, G Garcia, "Electrochromic nanocomposite films**," 2011**.
3. DJ Milliron, R Tangirala, A Llordes, "Inorganic Nanocomposite and Method of Making Thereof," **2010.**

## Contributions to Conferences

### Oral presentations

- 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 PAÏSOS CATALANS*. January, 2006. Lleida (Spain).

**Posters**

- Llordés, A.; Hammack, A. T.; Buonsanti, R.; Tangirala, R.; Aloni, S.; Helms, B.A.; Milliron, D.J. "Polyoxometalates and Colloidal Nanocrystals as Building Blocks for Metal Oxide Nanocomposite Films". In *International Symposium on Advanced Complex Inorganic Nanomaterials (ACIN). September, 2011.* Namur, Belgium.
- 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 *European Materials Research Society (E-MRS) Spring Meeting 2009*. 2009/06/8. Strasbourg (France).
- Llordés, A.; Gutiérrez, J.; Gázquez, J.; Pomar, A.; Abellán, P.; Sandiumenge, F.; Ricart, S.; Puig, T.; Obradors, X. "Capas nanocomposite superconductoras de alta eficiencia obtenidas por métodos químicos: de la solución precursora a la nanoestructura". In *13ª Reunión Científica Plenaria de Química Inorgánica, 7ª Reunión Científica Plenaria de Química de Estado Sólido, QIES - 2008*. 2008/09/16. Almuñécar, Granada (Spain).
- Llordés, A.; Gutiérrez, J.; Gázquez, J.; Gibert, M.; Romà, N.; Ricart, S.; Pomar, A.; Sandiumenge, F.; Mestres, N.; Puig, T.; Obradors, X. "High-current $YBa_2Cu_3O_{7-x}$-$BaZrO_3$ nanocomposite thin films by chemical deposition". In *8th International Conference on Applied Superconductivity (EUCAS)*. 2007/9/16. Brussels (Belgium).
- Llordés, A.; Ricart, S.; Obradors, X.; Puig, T.; Pomar, A.; Gàzquez, J.; Sandiumenge, F. "Nanostructuring $YBa_2Cu_3O_7$ Thin Films by Metal Organic Decompsition". In *Nanospain*. 2006. Pamplona (Spain).
- Llordés, A.; Ricart, S.; Obradors, X.; Puig, T.; Pomar, A.; Gàzquez, J.; Sandiumenge, F. "Nanostructuring $YBa_2Cu_3O_7$ Thin Films by Metal Organic Decompsition". In *REUNIÓN CIENTÍFICA PLENARIA DE QUÍMICA INORGÁNICA Y DEL ESTADO SÓLIDO, QIES06*. 2006. Barcelona (Spain).
- Llordés, A.; Moreto, J. M.; Ricart, S. In *XXII REUNIÓN DEL GRUPO ESPECIALIZADO DE QUÍMICA ORGANOMETÁLICA* Ciudad Real 2004. (Spain).

## Schools and courses:

- "Transmission 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).