**Dr. Erwan RAUWEL**
(28/05/1974)

**Nationality**: French
**Status**: Married, 2 children
Tallinnn University of Technology, Tartu college
Puiestee 78
%1008 Tartu, Estonia
Tel : + 372 54569909
rauwel@ua.pt

## EDUCATION

- **Habilitation**, 21 Dec. 2012, University of Caen,, CRISMAT Laboratory (FRANCE)
  « Oxide thin films deposition and nanoparticles synthesis for microelectronics, sensors, catalysis and optical applications. »
- **Ph.D in Chemistry of Materials**, 17 Dec. 2003, University of Caen, CRISMAT (FRANCE)
  Thesis: « Synthesis and characterization of charge ordered manganite thin films $Ln_{0.5}Ca_{0.5}MnO_3$ (Ln = Pr, Nd, Sm), grown by pulsed laser deposition. »
- **M.S. in Materials Science (DEA)**, University of Caen, July 1999 (with remarks: Good)

## HIGHLIGHTS

- Synthesis of oxide thin films (techniques: PLD, Sputtering, MOCVD and ALD )
- Structural and physical characterizations of thin films (DRX, XRR, SEM, EDS, XPS, FTIR, ATR-FTIR, TGA, C(V), PPMS: R(T), SQUID)
- Vacuum techniques
- Manganite compounds, “High-κ” dielectric and multiferroic compounds
- Deposition chambers (ALD, MOCVD)
- Nanoparticles synthesis (metal and oxides)

## RESEARCH EXPERIENCE

*** 01/02/2013 – 30/11/2013: Guest Lecturer** at Univ. of Tallinn, Tartu College, Estonia
Teaching of “Materials Science”

*** 01/05/2012- 05/05/2012: Invited Professor** at Univ. of Tartu, Estonia
4 lectures (~8 hrs) presented at the Doctoral school of Univ. of Tartu

*** 03/2009 -03/2012: Researcher, Norway,** Univ. of Oslo, Dpt. of Chemistry

- Fischer Tropsch catalyst improvement using ALD technique
- Fluorescence thermal imaging research using ALD technique and nanoparticles synthesis
- Metal nanoparticles synthesis
- Collaboration with Univ. of Aveiro, CICECO

**Marie Curie ERG grant:** PERG05-GA-2009-249243 *“ALD-Sputtering-Oxides”*

**Project leader** of the « metal nanoparticles synthesis for catalyst applications » project
Supervisor of Dr. Mohamed Karmaoui (Postdoc) (1 patent)

**European collaboration (coordinator):** "Oxygen barrier diffusion applied to Si-based components and microelectronics devices" project. This project regroups 4 institutions: Univ. of Aveiro (Portugal), Univ. of Oslo, Minatec (Norway), Grenoble (France), Inst. of Physics of Bratislava (Slovakia).

**Achievements:** A new type of glass chamber ("powder cell") capable of producing fluidized bed for ALD reactor. Combination of nanoparticles synthesis and ALD for low temperature thermal imaging. A new one step chemical method for the production of metal nanoparticles (Co, Ni, Ag…) stable under air.

* **12/2008 – 02/2009: Postdoc fellow (FCT 5 years grant), Portugal,** Univ. of Aveiro, CICECO

**Achievements:** A new method to control the oxygen stochiometry inside oxide thin films and the oxygen diffusion using sputtering deposition method (patent granted).

*** 06/2006 – 11/2008: Marie Curie fellow (2 years), Portugal,** Univ. of Aveiro, CICECO
**Marie Curie IEF Fellowship**: MEIF-CT2006-041632
*"Multiferroic nanostructures: a non-aqueous sol-gel approach"*

**Achievements:** A new process to grow thin films at low temperature (50-350°C) with low carbon contamination . Reduction of the oxide interlayer growth during deposition on silicon substrates. Coating of carbon nanotubes, outside and inside, for many applications (CNFETs, catalysis, fuel cells…) (patent).

*** 01/2004-06/2006: Postdoctoral position, France,** Grenoble, LMGP and STMicroelectronics,

**Achievements:** Stabilisation the cubic phase of $HfO_2$ by Mg (patented) and Y doping. Decrease of the interfacial layer of $SiO_2$ and increase of the permittivity by controlling the growth conditions.

Participation in several European projects concerning the replacement of the $SiO_2$ dielectric gate in transistor technology by a high κ material (in close collaboration with STMicroelectronics).
***- MEDEA$^+$ T207 European Project***
http://www.medeaplus.org/web/downloads/profiles/T207_profile.pdf
***- SINANO full title: "Silicon-Based Nanodevices" Network of excellence***
http://fmnt.online.fr/SINANO.pdf

*** 09/2000-12/2003: Ph D Student, France,** Univ. of Caen, CRISMAT.

**Achievements:** Understanding of the mechanisms inducing a decrease of the charge ordering in charge ordered manganite thin films. Focus on substrate-induced strain leading to structural « quenching ».

## WORK EXPERIENCE

| | |
|---|---|
| 1999/2000 | Army with function of trainer, shooting teacher and armourer |
| 1992-2000 | Camp counsellor (all summers) |
| Jul. 1995 | Responsible for purchase of equipment for gloves box in radioactive environment at ″ COGEMA la Hague″, AREVA group, France |
| Jul. 1993 | Maintenance of removal nuclear fuel rods from cooling pool at ″ COGEMA la Hague″, AREVA group, France |

## SUPERVISION

**Postdoc**:
Dr. Mohamed Karmaoui (11/2009 – 06/2010)

- Metal nanoparticles project (synthesis for catalytic applications).

## REFEREE (11 peer-reviewed journals)

Regular reviewer: Journal of Materials Chemistry (A, B and C), Dalton Transactions, Electrochemical and Solid-State Letters, ECS Journal of Solid State Science and Technology, Journal of The Electrochemical Society.

Reviewer: Materials Letters, Applied Physics Letters, Journal of Applied Physics, Chemical Communications, CrystEngComm, Journal of Vacuum Science and Technology A, Material Science and Engineering B.

## REVIEWER AND JURY MEMBER

July 2012: Master (Bologna Process)
Rui Miguel Martins Ramalhadeiro, Univ. of Aveiro, CICECO, Portugal
"Optical and structural study of thin films of ZnO/MgO deposited by RF-sputtering"

## COLLABORATIONS

- Dr. Augustinas Galeckas (Researcher, SMN, MiNiLab, University of Oslo, Norway)
- Dr. Tanel Tätte (Researcher, Institute of Physics, University of Tartu, Estonia)
- Dr. Kaupo Kukkli (Group leader, Institute of Physics, University of Tartu, Estonia)
- Dr. Frédérique Ducroquet (CNRS researcher, IMEP-Minatec, Grenoble, France)
- Prof. Armando Lourenço (Professor, CICECO, University of Aveiro, Portugal)
- Prof. Vitor Amaral (Professor, CICECO, University of Aveiro, Portugal)
- Dr. Protima Rauwel (Researcher, Dpt. of Physics & SMN, University of Oslo, Norway)
- Dr. Mangala Singh (Postdoc, Brock University, Québec, Canada)
- Dr. Igor Matko (Researcher, University of Bratislava, Bratislava, Slovakia)

## PROJECTS:

- "MULTIFOX: Modificação e estudo à escala nanométrica de óxidos multiferróicos" (PTDC/FIS/105416/2008) (180000 Euros): **Consulting expert.**
The goal of this 3 years project is the study of multiferroics oxides at the nanometric scale.

- "Local probe studies on Metal/Oxide junctions project" (CERN/FP/109325/2009) (2500 Euros; 1 year project): **Collaborator.**

- "Synthesis and characterization of multiferroic nanostructures synthesized via novel non-aqueous sol-gel routes" (PTDC/CTM/65667/2006) (151000 euros): **As researcher in the project.**
The goal of this 3 years project was to study new ways of synthesis of multiferroics oxides.

## AWARDS and GRANTS (Applicant)

Prizes:

- **InGAP competition 2009** (research project: catalytic chemistry for natural gas conversion)
  1st price
  Project: « metal nanoparticles synthesis for catalyst applications »
  6 month funding for a Post-Doc + 6000 Euros for consumables

Grants:

- **Marie Curie IEF Fellowship**: MEIF-CT2006-041632 (Mark: 89.5/100)
  *"Multiferroic nanostructures: a non-aqueous sol-gel approach"* (01/12/2006 to 30/11/2008)
  2 years contract & 20000 Euros for consumables

- **Marie Curie ERG grant:** PERG05-GA-2009-249243 (Mark : 87,8/100)
  "*ALD-Sputtering-Oxides"* (01/10/2009 to 30/09/2012)
  45000 Euros (financial research support for 3 years)

- **FCT Grant** (Portugal): SFRH/BDP/45136/2008
  *"Deposition of multiferroic compounds and heterostructures using sputtering, interface optimization and growth improvement to build an oxide based field-effect transistor."*
  5 years of salary & 2500 Euros/year for consumables

## QUALIFICATIONS

Qualified to apply as associate Professor in France the fields of:

- "Condensed Matter" and related fields
- "Materials Chemistry" and related fields

(French Minister of Education and Research certification)

## MEMBERSHIP

Member of The Electrochemical Society (since 2005)
Member of The American Chemical Society (since 2010)

## LANGUAGES

- French (mother tongue)
- English
- Portuguese
- Spanish, German and Norwegian basics

**TEACHING DETAILS:**

**2012** **Invited Professor at the University of Tartu, Estonia: Doctoral school "Functionalized Materials and technology" in the field of Nanotechnology (~8hrs)**

- "Manganite thin films and their applications"
- " $HfO_2$ thin films for dielectric gates"
- "ALD as a method for building nanostructured materials"
- "The methods for preparation of nano powders"

**2005-2006** **Teaching assistantships at Ecole Nationale Supérieur de Physique de Grenoble**

● 2005-2006 **(33hrs laboratory courses)**

**Materials science (2nd year (4th year Bachelor))**:

Hall effect

Supraconductivity

Microstructure (metal alloys)

**2000-2003** **Teaching assistantships at University of Caen (Cherbourg)**

● 2000-2001 **(30hrs laboratory courses)** and 2001-2002 **(9hrs laboratory courses)**

**Electrochemistry, 1st year Bachelor « Structure and materials science »**:

Reduction-Oxidation reactions (iron with potassium permanganate).

Acid-Base reactions (strong acids, mixture strong acid-weak acid).

Calculation of the enthalpies of reactions from bond energies.

Calculation of O-O bond energy in $H_2O_2$.

**Teaching assistantships at École d'Ingénieur de Cherbourg (University of Caen)**

● 2002-2003 **(18hrs laboratory courses)**

**Polymer mechanic (3rd year (5th year Bachelor))**:

Stretching tests on various polymers.

TGA measurements on polymer glues.

Tests of viscosimetry on various polymers.

● 2000-2001 **(30hrs laboratory courses)**

**Metallurgy (2nd year (4th year Bachelor))**:

Metallography (Optical microscopy).

Quenchings (Sintering, quenching, annealing and hardness measurements).

Differential thermal analyses (DTA).

Solid-gas reaction (study of the diffusion).

Precipitation hardening of alumina alloys (Stretching tests).

Tempering of alumina and its alloys.

Synthesis of a ceramic ($BaTiO_3$).
X-ray diffraction.

● 2000-2001 **(36hrs laboratory courses)** and 2001-2002 **(33h = laboratory courses)**
**Electrochemistry (1st year (3rd year Bachelor))**:
Reduction-Oxidation reactions (iron with potassium permanganate).
Acid-Base reactions (strong acids, mixture strong acid-weak acid).
Calculation of the enthalpies of reactions from bond energies.
Calculation of O-O bond energy in $H_2O_2$.

**2001-2003** **Teaching assistantships at Institut Universitaire Technologique « Mesures Physiques » (Industrial Physics) of University of Caen (Bachelor)**

● 2001-2002 **(54hrs laboratory courses)** and 2002-2003 **(54hrs laboratory courses)**
**Electrochemistry (2nd year Bachelor)**:
Reduction-Oxidation, potentiometry.
Acid-Base reactions.
Conductimetry (Influence of the temperature and the concentration).
Measurement of the quantity of copper in the water coming from the tap using atomic absorption spectroscopy (without flame).

**1998-1999** **Class Teaching assistant at University of Caen (Tutorials / group teaching) (20hrs)**
**1st year Bachelor**, University « Structure and materials science ».
Thermochemistry

| | 1998-99 | 2000-01 | 2001-02 | 2002-03 | 2005-06 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|
| Metallurgy: School of engineering 2nd year | | 30 H | | | | | |
| University (Chemistry) 1st year | 20 H | 30 H | 9 H | | | | |
| Electrochemistry: School of engineering 1st year | | 36 H | 33 H | | | | |
| Electrochemistry: Bachelor degree IUT "Industrial Physics" 2nd | | | 54 H | 54 H | | | |
| Polymer: School of engineering 3rd year | | | | 18 H | | | |
| Materials science: School of engineering 2nd year | | | | | 33 H | | |
| Doctoral school of Functionalized Materials and Technology | | | | | | 8H | |
| Technical school of Tallin, Tartu college | | | | | | | 1.5H |

Total: **8 hrs of lectures + 20 hrs lessons/courses + 297 hours of laboratory courses.**

## RECORD OF WORK

**Publications**: 41
**H-index:** 11
**Book chapter:** 1
**Patents**: 3 international patents and 1 UK patent
**Oral presentation contributions**: 33
**Poster presentation contributions**: 16

## PATENTS

**1 - « Integrated electronic circuit, has hafnium oxide based electrically isolating thin layer portion containing atoms of magnesium under form of oxide mixing of hafnium and magnesium and separated of transistor channel by intermediate layer. »**
C. Dubourdieu, E. Rauwel, V. Cosnier, S. Lhostis, D. Bensahel
French and U.S. patent application, FR2915623-A1; WO2008155490-A2
Applicant: STMicroelectonics (Crolles 2) SAS
Centre National de la Recherche Scientifique – CNRS
INST NAT Polytechnique Grenoble

**2 - « Non Aqueous thin films formation. »**
N. Pinna, E. Rauwel
International patent application, WO2008098963-A2, February 2008
With: University of Aveiro

**3 - « Ultrathin metallic Mg oxygen barrier diffusion applied for microelectronics devices. »**
E. Rauwel, A. Lourenço
International patent application, WO2011070398
With: University of Aveiro

**4 - « Metal nanoparticles synthesis. »**
E. Rauwel, M. Karmaoui, P. Rauwel
UK patent application, PCT/GB2011/001037, July 2010, WO/2012/004573
Applicant: E. Rauwel

## PUBLICATIONS

2001

**1 - « Control of colossal magnetoresistance by strained effect in $Nd_{0.5}Ca_{0.5}MnO_3$ thin films. »**
E. Rauwel Buzin, W. Prellier, Ch. Simon, S. Mercone, B. Mercey and B. Raveau, J. Sebek and J. Hejtmanek, Appl. Phys. Lett. **79**, 647 (2001).

2002

**2 - « Relation between structural distortions and transport properties in $Nd_{0.5}Ca_{0.5}MnO_3$ strained thin films. »**
E. Rauwel Buzin, W. Prellier, B. Mercey, Ch. Simon and B. Raveau, J. Phys. Condens. Matter **14**, 3951-3958 (2002).

**3 - « High magnetic field transport measurements of charge-ordering in $Pr_{0.5}Ca_{0.5}MnO_3$ strained thin films. »**
W. Prellier, E. Rauwel Buzin, Ch. Simon, B. Mercey, and B. Raveau, S. de Brion and G. Chouteau, Phys. Rev. B **66**, 024432 (2002).

2003

**4 - « Strain effects in charged-ordered $Pr_{0.5}Ca_{0.5}MnO_3$ manganite thin films. »**
W. Prellier, E. Rauwel Buzin, B. Mercey, Ch. Simon, M. Hervieu and B. Raveau, J. of Phys. and Chem. of Solids **64**, 1665 (2003).

**5 - « Phase separation in $Pr_{0.5}Ca_{0.5}MnO_3$ thin films. »**
S. de Brion, G. Storch, G. Chouteau, A. Janossy, W. Prellier and E. Rauwel Buzin, Eur. Phys. J. B **33**, 413 (2003).

2004

**6 - « Magnetic Phase diagram in the charge-ordered $Pr_{0.5}Ca_{0.5}MnO_3$ strained thin films**. »
S. de Brion, G. Chouteau, A. Janossy, E. Rauwel Buzin and W. Prellier, Journal of Magnetism and Magnetic Materials **272-276**, 450 (2004).

2005

**7 - « CMR effect exalted by substrate-induced strains in thin films of charge ordered manganites. »**
E. Rauwel Buzin*, W. Prellier, B. Mercey and S. de Brion, Journal of Crystal Growth **275**, e2409 (2005).

**8 - « Stress deformations and structural quenching allow a huge decrease of the melting magnetic field in $Sm_{0.5}Ca_{0.5}MnO_3$ thin films. »**
E. Rauwel, W. Prellier and B. Mercey, S. De Brion and G. Chouteau J. of Appl. Phys. **98**, 093903 (2005)

2006

**9 - « Growth by liquid injection MOCVD and properties of $HfO_2$ films for microelectronic applications. »**
C. Dubourdieu, E. Rauwel, C. Millon, P. Chaudouet, F. Ducroquet, N. Rochat, S. Rushworth, D. Bensahel, Chemical Vapor Deposition **12**, 187 (2006).

**10 - « Stabilisation of the cubic phase of $HfO_2$ by Y addition in films grown by MOCVD. »**
E. Rauwel, C. Dubourdieu, B. Holländer, N. Rochat, F. Ducroquet, M. Rossel, G. Van Tendeloo, B. Pelissier, Appl. Phys. Lett. **89**, 012902 (2006).

**11 - « Integration of self-assembled carbon nanotube transistor: statistics and gate engineering at the wafer scale. »**
L.Marty, A. Bonhomme, A. Iaia, E. André, E. Rauwel, C. Dubourdieu, A. Toffoli, F. Ducroquet, A.M. Bonnot and V. Bouchiat Nanotechnology **17**, 5038 (2006).

2007

**12 - « Growth of $La_{1-x}Ca_xMnO_3$ thin films by atomic layer deposition. »**
O. Nilsen, E. Rauwel, H. Fjellvåg, A. Kjekshus J. Mater. Chem. **17**, 1466 (2007) – Front cover.

2008

**13 - « Anomalously large ferromagnetic Curie temperature in cation-ordered epitaxial $Bi_2CoMnO_6$ thin films. »**
M.P. Singh, K.D. Truong, P. Fournier, P. Rauwel, E. Rauwel, L.P. Carignan, and D. Ménard, Appl. Phys. Lett. **92**, 112505 (2008).

**14 - « Non-Aqueous Routes to Metal Oxide Thin Films by Atomic Layer Deposition. »**
E. Rauwel, G. Clavel, M.-G. Willinger, P. Rauwel, N. Pinna, Angew. Chem. Int. Ed. **47**, 3592 (2008).

**15 - « Carboxylic acids as oxygen sources for the atomic layer deposition of high-κ metal oxides. »**
E. Rauwel, M.-G. Willinger, F. Ducroquet, P. Rauwel, I. Matko, D. Kiselev and N. Pinna, J. Phys. Chem. C **112**, 12754 (2008).

**16 - « Vanadium oxide sensing layer grown on carbon nanotubes by a new atomic layer deposition process. »**
M.-G. Willinger, G. Neri, E. Rauwel, A. Bonnavita, G. Micali and N. Pinna, Nano-Letters **8(12)**, 4201-4204 (2008).

2009

**17 - « Non-aqueous sol-gel routes applied to atomic layer deposition of oxide. »**
G. Clavel, E. Rauwel, M.-G. Willinger, N. Pinna, J. Mater. Chem. **19**, 454 (2009).

**18 - « Effect of annealing and electric properties of high-κ thin films grown by ALD using carboxylic acids as oxygen source. »**
E. Rauwel, F. Ducroquet, P. Rauwel, M.-G. Willinger, I. Matko, N. Pinna J. Vac. Sci. and technol. B **27(1)**, 230 (2009).

**19 - « Radical approach to promote the multiferroic in double perovskites. »**
M.P. Singh, K.D. Truong, P. Fournier, P. Rauwel, E. Rauwel, L.P. Carignan, and D. Ménard, Journal of Magnetism and Magnetic Materials **321(11)**, 1743 (2009).

**20 - « Addition of yttrium into $HfO_2$ films: microstructure and electrical properties. »**
C. Dubourdieu, E. Rauwel, H. Roussel, F. Ducroquet, B. Holländer, M. Rossell, G. Van Tendeloo, S. Lhostis, S. Rushworth J. Vac. Sci. Technol. A **27**(3), 503-514 (2009).

**21 - « The controlled deposition of metal oxide onto carbon nanotubes by atomic layer deposition: Examples and a case study on the application of $V_2O_4$ coated nanotubes in gas sensing. »**
M.-G. Willinger, G. Neri, A. Bonavita, G. Micali, E. Rauwel, T. Herntrich and N. Pinna Physical Chemistry Chemical Physics **11**, 3615 (2009).

2010

**22 - « Study of $Ni_2$-Mn-Ga phase formation by RF sputtering film deposition at low temperature onto Si substrates and $LaNiO_3$/Pb(Ti,Zr)$O_3$ buffer. »**
F. Figueiras, E. Rauwel, V. S. Amaral, N.Vyshatko, A. L. Kholkin, C. Soyer, D. Remiens, V. V. Shvartsman, P. Borisov, W. Kleemann J. Vac. Sci. Technol. A **28(1)**, 6 (2010).

2011

**23 - « Metallic oxygen barrier diffusion applied to high-κ deposition. »**
E. Rauwel, P. Rauwel, F. Ducroquet, I. Matko and A. C. Lourenço J. Vac. Sci. Technol. B **29**, 01A701 (2011).

**24 - « Nanostructuring in β-$Zn_4Sb_3$ with variable starting Zn compositions. »**
P. Rauwel, O. M. Løvvik, E. Rauwel, E. Toberer, J. G. Snyder and J. Taftø Physica Status Solidi A **208,** 1652 (2011) – Front cover – PSS Best of 2011 (http://www.materialsviews.com/details/news/1431089/Best_of_pss_2011.html).

**25 - « Nanovoids in thermoelectric β-$Zn_4Sb_3$: A possibility for nanoengineering via Zn diffusion.** »
P. Rauwel, O. M. Løvvik, E. Rauwel and J. Taftø Acta Materialia **59** (13), 5266 (2011).

**26 - « Precursor-Dependent Blue-Green Photoluminescence Emission of ZnO Nanoparticles. »**
E. Rauwel, A. Galeckas, P. Rauwel, M. F. Sunding and H. Fjellvag J. Phys. Chem. C **115**(51), 25227 (2011).

2012

**27 - « ALD Applied to Conformal Coating of Nanoporous γ-Alumina: Spinel Formation and Luminescence Induced by Europium Doping »**
E. Rauwel, A. Galeckas, P. Rauwel, O. Nilsen, J. C. Walmsley, E. Rytter and H. Fjellvåg J. Electrochem. Soc. **159**(4), P45-P49 (2012).

**28 - « Unusual photoluminescence of $CaHfO_3$ and $SrHfO_3$ nanoparticles. »**
E. Rauwel, A. Galeckas, P. Rauwel, H. Fjellvåg Adv. Func. Mat. **22**(6), 1174-1179 (2012).

**29 - « Response to Comment on "Unusual photoluminescence of $CaHfO_3$ and $SrHfO_3$ nanoparticles." »**
E. Rauwel, A. Galeckas, P. Rauwel, D. Wragg Adv. Func. Mat. **22**(6), 1114-1115 (2012).

**30 - « Magnesium metallic interlayer as an oxygen-diffusion-barrier between high-κ dielectric thin films and silicon substrate. »**
E. Rauwel, P. Rauwel, F. Ducroquet, M. F. Sunding, I. Matko and A. C. Lourenço Thin Solid Films **520**, 5602-5609 (2012).

**31 - « One step synthesis of pure cubic and monoclinic $HfO_2$ nanoparticles: Correlating the structure to the electronic properties of the two polymorphs. »**
P. Rauwel, E. Rauwel, C. Persson, M. F. Sunding, A. Galeckas J. App. Phys. **112**, 104107 (2012).

**32 - « Oxide coating of alumina nanoporous structure using ALD to produce highly porous spinel. »**
E. Rauwel, O. Nilsen, P. Rauwel, J. C. Walmsley, H. B. Frogner, E. Rytter and H. Fjellvåg Chemical Vapor Deposition **18**, 315 (2012).

**PROCEEDINGS (with peer review)**

2006

**33 - « Y-doped $HfO_2$ thin films grown by injection MOCVD. »**
E. Rauwel, F. Ducroquet, M. Rossel, J. Verbeeck and G. Van Tendeloo, B. Holländer, S. Rushworth and C. Dubourdieu, ECS Trans. **1**, (5) 249 (2006).

2008

**34 -« Carboxylic acids as oxygen supplying agents for atomic layer deposition of high-κ thin films. »**
E. Rauwel, F. Ducroquet, P. Rauwel, M.-G. Willinger, I. Matko, D. Kiselev and N. Pinna, ECS Trans. **16**, (4) 279 (2008).

2009

**35 - « Flat-Band Voltage and Structural Properties of hafnium dioxide films grown by liquid-injection MOCVD. »**
F. Ducroquet, E. Rauwel and C. Dubourdieu ECS Trans. **25**, (6) 23 (2009).

2010

**36 -** « **A novel approach for the preparation of metal oxide/CNTs composites for sensing applications**. »
G. Neri, A. Bonnavita, , G. Micali, G. Rizzo, M.-G. Willinger, E. Rauwel and N. Pinna Sensors and Microsystems: AISEM 2009 Proceeding, Lecture Notes in Electrical Engineering **54(2)**, 63 (2010).

**37 - « Dielectric Properties and Flat-Band Voltages on Doped-$HfO_2$ Thin Films. » (invited)**
F. Ducroquet, E. Rauwel, V. Brizé, and C. Dubourdieu ECS Trans. **28**, (2) 191 (2010).

**38 - « Oxygen Barrier Diffusion applied to High-κ Thin Films Deposition. »**
E. Rauwel, P. Rauwel, F. Ducroquet, I. Matko and A. C. Lourenço ECS Trans. **33**, (3) 497 (2010).

2011

**39 - « ALD Applied to Conformal Coating of Nanoporous γ-Alumina: Spinel Formation and Luminescence Induced by Europium Doping**. »
E. Rauwel, O. Nilsen, A. Galeckas, J. C. Walmsley, E. Rytter H. Fjellvåg ECS Trans. **41**, (2) 123 (2011).

**PROCEEDINGS (without peer review)**

2005

**40 - « Elaboration by injection MOCVD and characterization of $HfO_2$-$Y_2O_3$ thin films. »**
E. Rauwel, C. Dubourdieu, C. Millon, F. Ducroquet, B. Höllander, N. Rochat, V. Cosnier, D. Bensahel, Workshop de la société française du vide (Autrans), « Nouveaux oxydes à forte permittivité dans l'intégration des semi-conducteurs » page 31 (2005).

2010

**41 - « Nanostructuring in β-$Zn_4Sb_3$ with variable starting Zn compositions. »**
P. Rauwel, O. M. Løvvik, E. Rauwel, E. Toberer, J. G. Snyder and J. Taftø European Conference on Thermoelectricity ECT (2010).

**BOOK CHAPTER**

**1 - « Charge ordered manganite thin films. »**
W. Prellier, E. Rauwel Buzin and B. Mercey
Published in "Recent developments in Applied Physics" edited by Research Sign Post, India (2003).

**SCIENTIFIC REPORTS**

1 - « Transport measurements in charge-ordered $Pr_{0.5}Ca_{0.5}MnO_3$ thin films. »
S. de Brion, G. Chouteau, W. Prellier, E. Rauwel Buzin, Ch. Simon, B. Mercey, Grenoble High Magnetic Field Laboratory annual report 2001 pages 61-62.

2 - « Transport measurements in charge-ordered $(Nd, Sm)_{0.5}Ca_{0.5}MnO_3$ thin films. »
S. de Brion, G. Chouteau, W. Prellier, E. Rauwel Buzin, Grenoble High Magnetic Field Laboratory annual report 2002 page 43.

3 - « Magnetic order in the charge-ordered manganites. »
F. Dupont, G. Storch, S. de Brion, G. Chouteau, F. Millange, E. Rauwel Buzin, W. Prellier, Ch. Simon, A. Janossy, Grenoble High Magnetic Field Laboratory scientific report 1998-2002 pages 48-50.

## ORAL PRESENTATIONS

### International conference (22)

1 - « CMR effect exalted by substrate-induced strains in thin films of charge ordered manganites. »
E. Rauwel Buzin, W. Prellier, B. Mercey, S. de Brion and G. Chouteau, ICCG14, **Grenoble**, France, August 2004.

2 - « Characterization of rare-earth doped Hafnium dioxide thin films deposited by MOCVD. »
E. Rauwel Buzin, C. Dubourdieu, F. Ducroquet, N. Rochat, B. Holländer, C. Millon ECONET workshop, **Bratislava**, Slovakia, November 2004.

3 - « Y-doped $HfO_2$ thin films grown by injection MOCVD. »
E. Rauwel, F. Ducroquet, M. Rossel, J. Verbeeck and G. Van Tendeloo, B. Holländer, S. Rushworth and C. Dubourdieu 208$^{th}$ ECS Meeting, **Los Angeles**, USA, October 2005.

4 - « Nanoscale synthesis and interface engineering of High-κ oxides by MOCVD. »
C. Dubourdieu, E. Rauwel, O. Salicio, C. Millon, C. Durand, C. Vallée, M. Rossel, G. Van Tendeloo, S. Rushworth, L. Hubert- Pfalzgraf E-MRS, **Nice**, France, May 2006.

5 - « $SrTiO_3$ and $HfO_2$-based high-κ oxides on silicon for microelectronic applications. **»**
C. Dubourdieu, O. Salicio, E. Rauwel, I. Matko, F. Ducroquet, M. Rossel, G. Van Tendeloo,
N. Rochat, S. Daniele, Invited Paper, International Symposium on Integrated Ferroelectrics (ISIF), Session D: High K dielectrics and electrodes**, Bordeaux**, France, May 2007.

6 - « High-κ oxides on silicon by MOCVD: interface and microstructure engineering. » (Invited)
C. Dubourdieu, O. Salicio, E. Rauwel, I. Matko, F. Ducroquet, M.D . Rossel, G. Van Tendeloo, N. Rochat, O. Renault, S. Daniele, S. Rushworth, 5$^{th}$ International Conference on Silicon Epitaxy and Heterostructures (ICSI-5), **Marseille**, France, May 2007.

7 - « Non-aqueous sol-gel routes Applied to atomic layer deposition. »
E. Rauwel, G. Clavel, M.-G. Willinger, P. Rauwel, F. Ducroquet, N. Pinna, nanospain2008, **Braga**, Portugal, April 2008.

8 - « Radical approach to promote the multiferroic in double perovskites. »
M.P. Singh, K.D. Truong, P. Fournier, P. Rauwel, E. Rauwel, L.P. Carignan, and D. Ménard, E-MRS **Strasbourg**, France, May 2008.

9 - « ALD of high-κ thin films using carboxylic acids as oxygen supplying agents. »
E. Rauwel, F. Ducroquet, G. Clavel, P. Rauwel, M.-G. Willinger, I. Matko, and N. Pinna, 15$^{th}$ Workshop on Dielectrics in Microelectronics (WoDIM), **Bad Saarow (Berlin)**, Germany, June 2008.

10 - « $HfO_2$-based Solid Solutions for High-*k*/Metal Gate Stack Properties Improvement. » (Invited)
C. Dubourdieu, V. Brizé, J. Ubrig, S. Margueron, I. Matko, E. Rauwel, F. Ducroquet, N. Rochat, A. Klein, B. Holländer, 15$^{th}$ WoDIM conference, **Bad Saarow** (Berlin), Germany, June 2008.

11 - « Non-aqueous sol-gel routes to oxide thin films. »
N. Pinna, E. Rauwel, G. Clavel 8$^{th}$ International Conference on Atomic Layer Deposition, **Bruges**, Belgium, June 2008.

12 - « Carboxylic acids as oxygen supplying agents for atomic layer deposition of high-κ thin films. »
E. Rauwel, F. Ducroquet, P. Rauwel, M.-G. Willinger, I. Matko, D. Kiselev and N. Pinna, ECS 214th Meeting **Honolulu**, USA, October 2008.

13 - « Carboxylic acids as oxygen supplying agents for atomic layer deposition of oxide thin films. »
E. Rauwel, F. Ducroquet, P. Rauwel, M.-G. Willinger, I. Matko and N. Pinna, Baltic ALD2009 **Uppsala**, Sweden, June 2009.

14 - « Synthesis by CVD and characterisation of nanocale functional films and 1D structures. »
C. Dubourdieu, E. Rauwel, Y. Lai, O. Salicio, A. Klein, O. Lebedev, G. Van Tendeloo, F. Ducroquet, S. Rushworth European Materials Research Society Conference (E-MRS), **Strasbourg**, France June 2009.

15 - « Flat-band voltage and structural properties of hafnium dioxide films grown by liquid-injection MOCVD. »
F. Ducroquet, E. Rauwel, C. Dubourdieu ECS 216th Meeting **Vienna**, Austria, October 2009.

16- « Dielectric Properties and Flat-Band Voltages of Doped $HfO_2$. »
F. Ducroquet, E. Rauwel, C. Dubourdieu ECS 217th Meeting **Vancouver**, Canada, April 2010.

17 - « Nanostructuring in thermoelectric $Zn_4Sb_3$ with varying Zn concentrations. »
P. Rauwel, O. M. Løvvik, E. Rauwel, E. Toberer, J. G. Snyder and J. Taftø 10th annual meeting of the European Thermoelectric Society, **Como**, Italia, September 2010.

18 - **«** Oxygen barrier diffusion applied to high-k thin films deposition. »
E. Rauwel, P. Rauwel, F. Ducroquet, I. Matko and A. C. Lourenço ECS 218th Meeting **Las Vegas**, USA, October 2010.

19 - « Oxide coating of nanoporous alumina using ALD to produce highly porous spinel**. »**
E. Rauwel, O. Nilsen, J. Walmsley, E. Rytter, H. Fjellvåg ALD2011 conference **Cambridge**, USA, June 2011.

20 - « ALD applied to conformal coating of nanoporous γ-alumina: Spinel formation and luminescence induced by europium doping. »
E. Rauwel, O. Nilsen, A. Galeckas, J. Walmsley, E. Rytter, and H. Fjellvåg ECS 220th Meeting **Boston**, USA, October 2011.

21 - « Photoluminescence study of $CaHfO_3$ and $SrHfO_3$ nanoparticles synthesized via non-aqueous sol-gel process. »
E. Rauwel, A. Galeckas, M. Karmaoui, P. Rauwel, and H. Fjellvåg ECS 220th Meeting **Boston**, USA, October 2011.

22 - « Photoluminescence study and precursor dependence of ZnO nanoparticles synthesized via non-aqueous sol-gel process. »
E. Rauwel, A. Galeckas, P. Rauwel, and H. Fjellvåg ECS 220th Meeting **Boston**, USA, October 2011.

**National conference (11)**

1- « $Nd_{0.5}Ca_{0.5}MnO_3$ thin films deposited by pulsed laser deposition. »
E. Rauwel Buzin, W. Prellier et B. Mercey, Doctoral school days, **Caen**, France, April 2002.

2 - « Stability of the charge order orbital as a function of the strain in pulse laser deposited $Ln_{0.5}Ca_{0.5}MnO_3$ thin films. »
W. Prellier, E. Rauwel Buzin, B. Mercey, Ch. Simon, M. Hervieu and B. Raveau, Prospect in Magnetic Oxide Thin Films and Heterotructures meeting, **Versailles**, France, May 2002.

3 - « Oxide thin films presenting CMR deposited by pulsed laser deposition. »
W. Prellier, E. Rauwel Buzin, Ch. Simon, B. Mercey, Ph. Lecoeur, M. Hervieu and B. Raveau, GDR IS3, Interfaces and sensitive surface to the structure, **Batz sur mer**, France, May 2002.

4 - « The effect of strain on the transport properties of manganite thin films. »
E. Rauwel Buzin, W. Prellier, Ch. Simon, S. Mercone, and B. Mercey, S. de Brion and G. Chouteau, Mid-term Meeting HP network "Superconductivity and giant magnetoresistance in the framework of the extended van Hove scenario", **Caen**, France, August 2002.

5 - « Relation between structural distortions and transport properties in $Nd_{0.5}Ca_{0.5}MnO_3$ thin films. »
E. Rauwel Buzin, W. Prellier, Ch. Simon, B. Mercey et B. Raveau, S. de Brion et G. Chouteau, GRD "Oxydes à propriétés remarquables", **Paris**, France, November 2002.

6 - « Relation between structural distortions and transport properties in $Nd_{0.5}Ca_{0.5}MnO_3$ thin films. »
E. Rauwel Buzin, W. Prellier, Ch. Simon, et B. Mercey, S. de Brion et G. Chouteau, Journées européennes sur les oxydes pour applications magnétiques, **Fontevraud**, France, March 2003.

7 - « Strain relaxation and control of the structure in $Nd_{0.5}Ca_{0.5}MnO_3$ thin films deposited on $SrTiO_3$ by pulsed laser deposition. »
E. Rauwel, W. Prellier, Ch. Simon, et B. Mercey, S. de Brion, GDR Relax, **Grenoble**, France, June 2004.

8 - « New formulations of $HfO_2$ compounds: Elaboration and characterization of thin films grown by LI-MOCVD. »
E. Rauwel, C. Millon, C. Dubourdieu, F. Ducroquet, N. Rochat, B. Pelissier, B. Holländer, V. Cosnier, SFV : « Nouveaux oxydes à fortes permittivité dans l'intégration des semi-conducteurs », **Autrans**, France, January 2005.

9 - « A Novel Approach for the Preparation of Metal Oxide/CNTs Composites for Sensing Applications»
G. Neri, A. Bonavita, G. Micali, G. Rizzo, M.-G. Willinger, E. Rauwel, N. Pinna, AISEM 2009, **Pavia**, Italia, February 2009.

10 - « Atomic layer deposition applied to catalyst improvement»
E. Rauwel, O. Nilsen, J. Walmsley and H. Fjellvåg inGAP seminar 2010, **Oslo**, Norway, June 2010.

11 - « ALD system combined with glass powder cell applied to oxide coating of nanoporous γ-alumina. »
E. Rauwel, O. Nilsen, J. Walmsley, E. Rytter, and H. Fjellvåg inGAR seminar 2011, **Trondheim**, Norway, December 2011.

## POSTERS

### International conference (6)

1 - « Elaboration and characterization of Y-doped $HfO_2$ thin films grown by MOCVD. »
E. Rauwel Buzin, C. Dubourdieu, F. Ducroquet, N. Rochat, B. Holländer, C. Millon, MRS, **Boston**, USA, November 2005.

2 - « Carboxylic acids as oxygen supplying agents for ALD of High-κ thin films. »
E. Rauwel, F. Ducroquet, P. Rauwel, M.-G. Willinger, I. Matko and N. Pinna, 8th International Conference on Atomic Layer Deposition, **Bruges**, Belgium, June 2008.

3 - « Study of Ni-Mn-Ga Phase formation by low temperature RF –sputtering film deposition on Si substrate and $LaNiO_3$/$Pb(Ti,Zr)O_3$ buffer. »
F. Figueiras, N.P. Vyshatko, E. Rauwel, C. Soyer, D. Remiens, V.V. Shvartsman, P. Borisov, W. Kleemann, V. S. Amaral, A. L. Kholkin Joint European Magnetic Symposia (JEMS08), **Dublin**, Ireland, September 2009.

4 - « Metallic oxygen barrier diffusion applied to high-k deposition. »
E. Rauwel, P. Rauwel, F. Ducroquet, I. Matko and A. C. Lourenço 15th Workshop on Dielectrics in Microelectronics (WoDIM), **Bratislava**, Slovakia, June 2009.

5 - « ALD applied to conformal coating of nanoporous γ-alumina: Spinel formation and luminescence induced by europium doping. »
E. Rauwel, O. Nilsen, A. Galeckas, P. Rauwel, J. Walmsley, E. Rytter, and H. Fjellvåg TNT2011 International Conference, **BTenerife – Canary Islands**, Spain, November 2011.

6 - « Unusual photoluminescence of undoped hafnia perovskite nanoparticles synthesized via non-aqueous sol-gel process. »
E. Rauwel, A. Galeckas, M. Karmaoui, P. Rauwel, and H. Fjellvåg TNT2011 International Conference, **BTenerife – Canary Islands**, Spain, November 2011.

**INVITED TALKS (7)**

1 - « How stress deformations and structural quenching allow a huge decrease of the melting magnetic field in charge ordered manganite thin films. », **Universität Tübingen,** Physikalisches Institut, Tübingen, Germany, Nov. 2003.

2 - « Synthesis and characterization of charge ordered manganite thin films $Ln_{0.5}Ca_{0.5}MnO_3$ (Ln = Nd, Sm), deposited by pulsed laser deposition. », **Université de Picardie,** Amiens, France, Dec. 2003.

3 - « Growth and study of thin films grown by PLD and MOCVD: strain in charge ordered manganite and synthesis of hafnium dioxide thin films with different doping. », **Institut des Nanosciences de Paris (INSP)**, Boucicaut, France, Feb. 2005.

4 - « Growth and study of thin films grown by PLD and MOCVD: strain in charge ordered manganite and synthesis of hafnium dioxide thin films with different doping. », **Ecole National Supérieur de Luminy (ESIL),** Marseille, France, March 2005.

5 - « Growth and study of thin films grown by PLD and MOCVD: strain in charge ordered manganite and synthesis of hafnium dioxide thin films with different doping. », **Laboratoire d'Étude des Matériaux Hors Équilibre (LEMHE)**, Orsay, France, March 2006.

6 - « Thin films growth deposited by pulsed laser deposition, liquid injection MOCVD and ALD: Study of substrate-induced strains, new formulations and process applied to microelectronic applications, sensors and catalysis. », **Univ. of Oslo**, Dpt. of Chemistry, Oslo, Norway, Nov. 2008.

7 - « Atomic layer deposition applied to nano-objects' coating and synthesis of metal oxide and metal nanoparticles. », **TU Bergakademie Freiberg**, Freiberg, Germany, August 2012.

**PUBLIC LECTURES (1)**

1- « Nanofabrication: Metal and Metal Oxide Nanoparticles Synthesis, a brief overview. »
Dpt. of astrophysics, **Univ. of Oslo**, Oslo, Fev. 2013