Curriculum Vitae

Isabel Maria Mercês Ferreira

FCT-UNL, Novembro 2011

Contents

PERSONAL DATA

Name	Isabel Maria Mercês Ferreira
Birthday	July, 29 1964
Identification card	7736809,
Telephone	351 96 2362197/ 351 21 2947564 ext 10626
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e-mail	imf@fct.unl.pt
Nationality	Portuguese
Civil status	Married (2 children-13 and 4 years hold)

ACADEMIC DEGREES

PhD in "**Silício hidrogenado amorfo e nanocristalino produzido pela técnica de HWPA-CVD**" - *Hydrogenated amorphous and nanocrystalline Silicon produced by HWPA-CVD Technique*, October 2002, Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa, in the field of Materials Engineering, specialization in Optoelectronics and Microelectronics.

"***Provas de Aptidão Pedagógica e Capacidade Científica***", public examination to pass from 1st stage Assistant to Assistant, July 1994, at Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa, passed with very good for the work titled "***Production and characterization of thin films based in the technology of silicon and its alloys***".

Dipl. Ing. in Physics and Materials Engineering (Option Materials - Specialization in Microelectronics and Energy Conversion), in December 1989, with the grade of 14/20, at Faculdade de Ciências e Tecnologia de Universidade Nova de Lisboa.

Main Background: nano/microtechnologies (including thin films); semiconductors; microelectronic processes; optoelectronics; energy conversion.

Complemented background: solid states physics and chemistry; structural properties of polymers, semiconductors, metals, composites, glasses and ceramics materials; management and quality control of materials.

PROFESSIONAL ACTIVITY

Since October 2002, Assistant Professor at Department of Materials Science of "Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa".

July 1994 to October 2002, Assistant at Department of Materials Science of "Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa".

1990 to 1994, Assistant 1st stage at Department of Materials Science of "Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa".

1997 to 1990, Monitor, supporting practical and laboratory classes of: Semiconductor Materials; Microelectronics; Solid State Electronics; and Energy Conversion, as a student of Physics and Materials Engineering at FCT-UNL.

ACADEMIC MANAGEMENT ACTIVITIES

Since 2008, vice-director of the Materials Research Center -CENIMAT.

Since 2007, member of the executive board of the Materials Science Department-DCM.

Since 2002, member of the scientific board of DCM.

Since 2008, Responsible of the Electronic Materials and Nanotechnologies group.

RESEARCH AND TEACHING STATEMENT

RESEARCH STATEMENT

I have started my research career in 1989, first as student researcher, then as PhD student and at moment, as Assistant Professor at the Department of Materials Science of FCT-UNL. After PhD in 2002, I have been developing independent research work at Materials for Electronic and Optoelectronics (MEO) group lead by Prof Rodrigo Martins. Inside the group, my involvement in all activities is a constant. One of the most important activities done was related to the launch of the first clean room and the microelectronics process lab in Portugal. Moreover, I also was involved in the pioneer work performed in Portugal in the field of amorphous silicon, for electronic and optoelectronic applications. Presently I am coordinating the activities of the group related to thin film technology applied to solar cells and launched R&D activity in the fields of: Thermoelectric Materials; solid state batteries on paper and bio-batteries; development of organic semiconductors based on micro/nano fibres; sintering of nano-oxides for electronics applications; activity related to the nano-toxicology and magnetic nanoparticles for hyperthermia. This activity is supported by the projects that I coordinate or I am the responsible at institution, in the last 4 years: 9 projects (3 Industrial; 3 Portuguese National Science Foundation; 2 from I3N; 1 European); to supervise 9 Research fellows; 18 Master thesis; 7 PhD thesis; 2 Pos-doc.

So, I can state that my research activity is presently multidisciplinary in the field of ***microelectronics*** and ***nanotechnologies***. That comes naturally due to my background in Materials Science and Engineering degree obtained at the Faculty of Science and Technology of New University of Lisbon, the unique Engineering degree in Portugal having a strong component of Microelectronics and Electronic/Optoelectronic materials. This multidisciplinary is well demonstrated by the projects that I coordinate and through the thematic of the PhD and MSc students under my supervision or co-supervision. Presently, the running research areas under my scientific responsibility can be divided in 4 main topics: ***1- Microelectronic and Optoelectronic devices***; 2-***Materials for Energy Conversion***; ***3- Optoelectronic Micro/Nano fibres***; and 4-***Nanomaterials and Nanotechnologies***. The people involved in the development of all these activities are ***1 Pos- doc***, ***7 PhD students***, ***5 MSc students***, ***3 Research Fellows*** with the collaboration of several other members of the CENIMAT, I3N as a whole and the MEO group.

1. MICROELECTRONIC AND OPTOELECTRONIC DEVICES

In this area I am supervising a PhD student to develop ***P***osition ***S***ensitive ***D***etectors for detecting systems based on laser triangulation. Using arrays of 32 1D detectors made of amorphous silicon pin structures with dimensions of 14 mm by 270μm we have, by the first time, demonstrate the possibility to detect in real time the position of a micro cantilever in a microscope [*1-PSD*] and the 3D mapping of macro-objects.

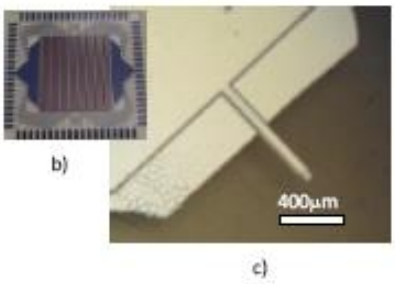
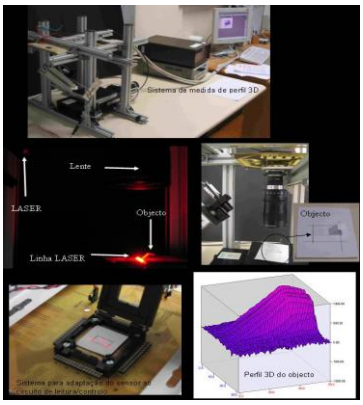


Image of the sensor and the micro cantilever

OPEN ACCESS
sensors
ISSN 1424-8220

Micro Cantilever Movement Detection with an Amorphous Silicon Array of Position Sensitive Detectors; J. Contreras, D. Costa, S. Pereira, E. Fortunato, R. Martins, R. Wierzbicki, H. Heerlein and **I. Ferreira**
Sensors 2010, 10, 8173-8184; doi:10.3390/s100908173



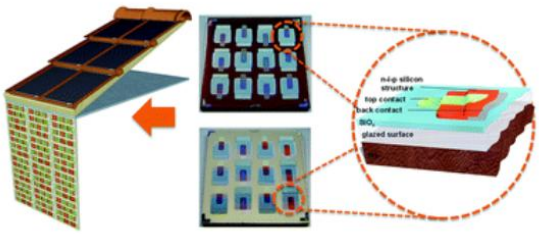
3D PSD Detection system coupled. 3D Image constructed for an object.

2. MATERIALS FOR ENERGY CONVERSION

As a member of the group of Materials for Electronic and Optoelectronics of the Materials Research Centre/Institute for Nanostructures Nanomodelling and Nanofabrication (CENIMAT/I3N) I am currently the responsible for the developments related with materials for energy conversion. Three main research lines are under my direct responsibility all based in thin film and microelectronic technologies - solar cells, thermoelectrics and batteries:

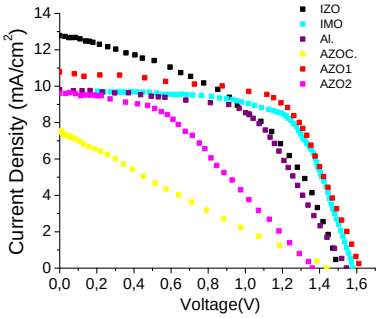
2.1. SOLAR CELLS

The development of high efficiency solar cells based on amorphous and nanocrystalline silicon thin films is the goal of this research activity supported by two QREN projects. One to produce ***solar tiles*** prototype (QREN 3380, promoted by Revigrês) and another to implement the efficiency of ***nanocrystalline solar cells*** (QREN 5610, promoted by Solar Plus). These are industry oriented demonstrating projects. Exciting results were already achieved and published at the highest impact factor journal in the area of energy (2- Solar Tiles. - Energy and Environment Science, IF=9.5), others are under preparation. Due to the innovative concept associated to this project a ***patent*** was also submitted (PAT 41758/10).



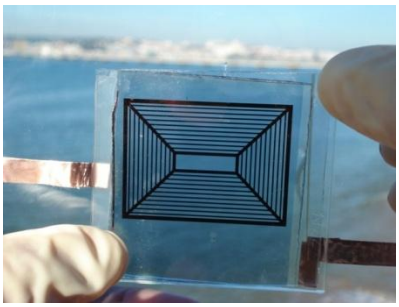
Prototype of Solar Tiles

Silicon thin film solar cells on commercial tiles; H. Aguas,* S. K. Ram, A. Araújo, D. Gaspar, A. Vicente, S. A. Filonovich, E. Fortunato, R. Martins* and I. Ferreira; Energy Environ. Sci., 2011, 4, 4620.

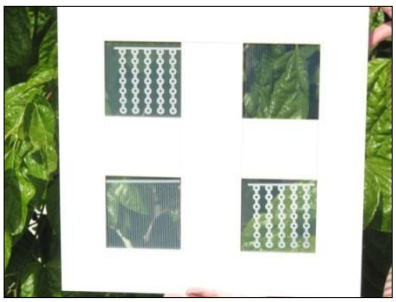


IV characteristics of a solar cell made in Solar Plus (enterprise) with different TCOs

Always looking to the innovative aspects of the research I tack the opportunity of having MSc students to supervise and to promote nonconventional and challenging developments with them. A prototype of semitransparent solar cells was produced in the framework of a MSc thesis [*Lucia Gomes MSC thesis, FCT-UNL 2007*]. This work was combined with an electrochromic device [*José Valadas MSC thesis, FCT-UNL 2007*] to fabricate, by the first time, a smart window that is controlled by the light.



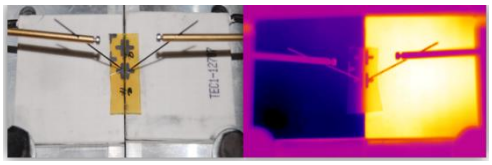
Smart window prototype (10cmx10cm)



Window prototype with semitransparent solar cells (10cmx10cm)

2.2. THERMOELECTRICS

The thermoelectric properties of thin films oxides were explored by a MSc student under my supervision [*Adriana Nogueira, MSc Thesis, 2010, FCT-UNL*], and the innovative results achieved seed a new research area inside the MEO group. The thermoelectric properties of $V_xM_yO_z$ (M=Zn, W, Sn) oxides are promising and have successfully potentiate our participation into an European Project (NANOTEG ENIAC/0002/2010) started in July 2011. This project is coordinated by Thales (France) and the consortium includes the major European players in the area of thermoelectrics.



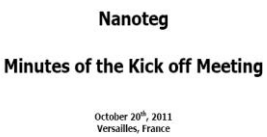
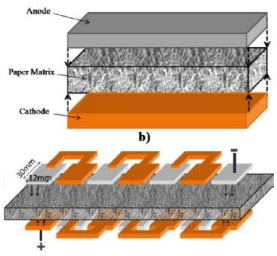


Image of a measurement of the thermoelectric potential (0.5mV) of VxOy film for a temperature differential ΔT of 5°C under room atmosphere and temperature.

2.3. PAPER BATTERIES

Thin film batteries made on and with paper is an original idea brought to MEO group by me in 2008. The consolidation of this activity was done by a MSc student under my supervision and his work end up with a proof of concept [*Bruno Bras, MSc Thesis FCT-UNL 2009*]. Being an innovative idea worldwide, ***national*** and ***international patents*** were submitted and two papers published [*3* and *4-Paper battery*]. This achievement was largely spread by the media and received an Honour Prize in the contest of the green project awards 2011.

Photo of the ceremony



Paper battery concept

Solid-state paper batteries for controlling paper transistors, I. Ferreira, B. Brás, J. I Martins, N. Correia, P. Barquinha, E. Fortunato, R. Martins. Electrochimica Acta 56 (2011) 1099–1105

2.4. THIN FILM BIO- BATTERIES

This activity is complementary of the previous one since the paper is replaced by a membrane of acetate cellulose produced by electrospinning to produce a bio-battery activated by organic fluids. Due to that we suggested to recover the body fluids such as sweat and produce energy. This activity started also in 2008, by a MSc student [*Ana Baptista, Msc Thesis, FCT-UNL 2009*] that received in 2010 a PhD student grant from FCT-MCTES to pursue this work. Another MSc student [Joana Neto, MSc Thesis, FTC-UNL, 2010] studied the same structure using a Polycaprolactone membrane, this polymer besides being biocompatible is also biodegradable allowing other possible applications like body implants. [*5-Biobattery*]

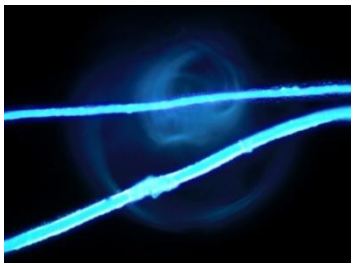
Thin and flexible bio-batteries made of electrospun cellulose-based membranes , A.C. Baptista, J.I. Martins, E. Fortunato, R. Martins, J.P. Borges, I. Ferreira, Biosensors and Bioelectronics 26 (2011) 2742–2745

Joana Neto -Best MSc thesis in Materials Science at National Level, 2011E-MRS prize.

Ana Baptista-Best MSc Thesis in Materials Science at National Level, 2009 SPM prize.

3. OPTOELECTRONIC NANO/MICRO FIBRES

A new research activity is growing in the area of organic semiconductors fibres produced by electrospining technique. This is a collaborative project with a colleague expert in electrospining and was financed by I3N to create seed knowledge in this field inside I3N, covering a lack in the research of organic semiconductors to optoelectronic devices application.



i3N

1. Summary

A. Administrative Information*

Project Short Title/Acronym: Opto-Electro-Fiber	
Project Full Title: Novel photo/conductive organic fibers for flexible optoelectronics	
Topic (Indicate the main project topics as listed below):	
☒ Fabrication and characterization of semiconductor nanostructures and nanodevices	
☐ Polymer-based nanocomposites and industrial-scale oriented processing	
☒ Flexible electronics and optoelectronics	
☐ Other (please specify):	
Total Project Costs: 50000 EUR	**Requested Funding:** 50000 EUR
Duration of the Project: 24 months	**Expected Start (MM/YY):** 01/09/2011
	Expected End (MM/YY): 31/08/2013

Fluorescent microfibres (<10μm of diameter) produced by electrospinning

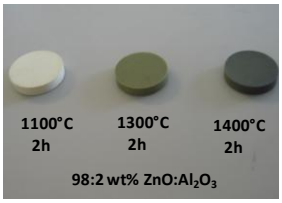
4. NANOMATERIALS AND NANOTECHNOLOGY

This area of research is supported by two projects one for developing sputtering targets produced with nano powders of metal oxides (zinc oxide) and the second aiming to

study the toxicology of TiO_2, diamond and SiO_x nano powders. Another activity started in the field of nanoparticles for hyperthermia with a PhD student grant.

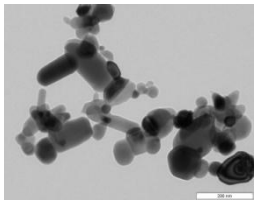
4.1. NANO OXIDES

The main goal of this project is to develop targets for sputtering systems used to produce thin film oxides for microelectronics and thin films devices. This activity started in 2009 in collaboration with INNOVNANO a Portuguese enterprise specialized in producing nano powder oxides under a QREN project 3454. This was a challenging area but the objectives were successfully achieved. This activity includes a PhD student doing the research work at the enterprise under my supervision. The relevant outputs of this activity are: one in print paper for the *Journal of America Society* (an important journal in the field of ceramic materials), one *best poster award* in the E-MRS conference (Varsaw, Poland 2011) [6-Nanopowders targets], and a *new product* for the enterprise that will start the commercialization of sputtering targets soon.



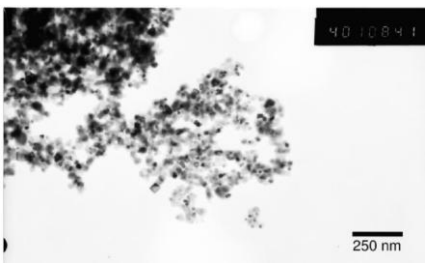
Targets produced with the nanopowders shown in the close figure.

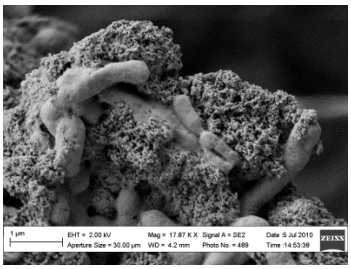
Poster of E-MRS 2011



4.2. NANOTOXICOLOGY

Investigations of the toxicological effects of nanoparticles in animals and environment are crucial to create safety standards for nanoparticles manipulation and to define consequences of its large scale usage. At CENIMAT this research activity is coordinated by me and it is supported by a National research project coordinated by LNEG - biology group and involves partners from Hospital Curry Cabral, IMAR-Instituto do Mar Coimbra and FCT-UNL Environment Department. A Master thesis have run under my supervision [*Joana Pereira, MSc Thesis, FCT-UNL 2010*]. This collaborative and multidisciplinary project is very important for a cross-fertilization and understanding of the new world of Nanotechnology and in particular of nanoparticles.



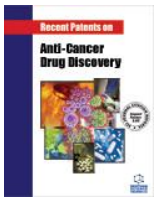


Nanoparticles of TiO_2 obtained by TEM and the particles inside the gut of a red fish.

4.3. MAGNETIC NANOPARTICLES FOR HYPERTHERMIA

This activity is fully new and results from a multi institutional cooperation, involving researchers with different backgrounds, going from life science to materials engineering

and nanotechnologies. A PhD student, will be supervisioned by me in the field of production and characterization of magnetic nanoparticles, while the functionalization with the corresponding pharmacology will be done by an expert in the field from Portuguese Institute of Oncology-IPO and Prof. João Paulo Borges a colleague of CENIMAT/I3N. This will comprise very challenging and innovative goals. The PhD student will start in January of 2012 but some publications were already accepted/submitted. [7-Hiperthermia]

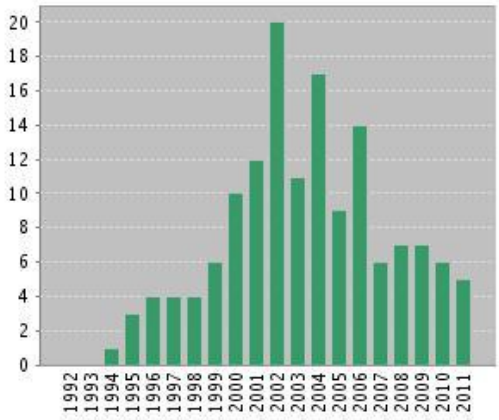


Application of Hyperthermia for Cancer Treatment: Recent Patents Review
Paula I. P. Soares, Isabel M. M. Ferreira,*, Rui A. G. B. N. Igreja, Carlos M. M. Novo and João P. M. R. Borges
***Recent Patents on Anti-Cancer Drug Discovery,* 2012, 7, 000-000 1**
1574-8928© 2012 Bentham Science Publishers

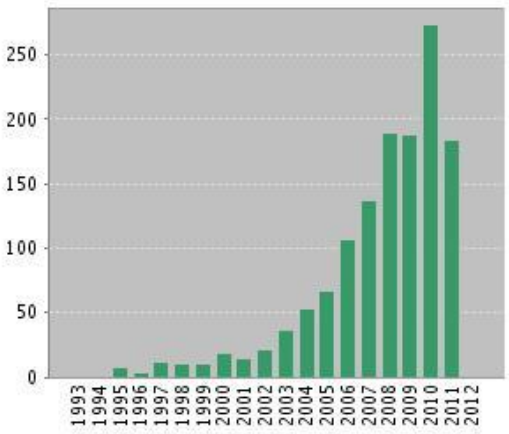
Overall is important to highlight that the R&D activities in which I am involved are possible because I integrate an excellent research centre CENIMAT/I3N and a group (MEO) were I can do independent activity and profit the excellent process and characterization facilities and of the several collaborations with experts in a broad range of fields which facilitates migration between complementary and supplementary fields within I3N and at National or International levels. I have also to emphasize that the developments in which I am involved have in common the use of different nanotechnology processes, from very thin films (less 100nm) to nano particles processing, growth and manipulation. On the other and, the microelectronics processes and technology is applied to the production of the most electronic applications I have demonstrated.

My currently scientific activity can be summarized as following:

Papers Published per Year:



Citations per Year



Source: ISI from web of Science, November 2011 (Ferreira I, Caparica).

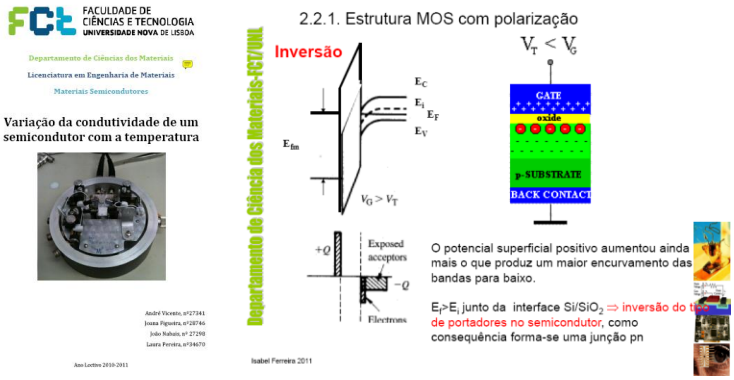
Scientific activity	Figures
Scientific papers -ISI	150
Total Citations	1340
Sum of Times Cited without self-citations	1087
Average citations per item	8.87
h Factor	19
Participation in Conferences	>84
Invited talks	>15
Patents	6
Involvement in organization of Conferences	3
Budget of Projects I Coordinate/ Responsible	1,598 k€
Budget of Projects Participation	4,111K€
Supervising of PhD Students	7
Supervising of MSc students	23
Participation in Academic Juries	6PhD+21 MSc
Reviewer of projects – ERC, FP7, AdI,	>150
Referee of scientific papers	>100
International collaborations	>20
Administrative positions	3
Prizes	5

Consolidating the new research areas that I started at MEO group, and believing they represent a challenge for the future, I expect to strength the existing Excellency of the group. Moreover, being multi- and inter- disciplinary areas, they will broad our research scope in the cutting edge of creativity and innovation. As FCT-UNL targets to be a research oriented University and as the proposed research is connected to the vision of future developments inside the fields of micro/ nano -fabrication aiming to process the electronics/optoelectronics of the future, it represents also an ambitious goal to bring research to the teaching field, as it is the case of the courses related to the running Integrated Master course in Micro and Nanotechnologies Engineering. Areas like Bioelectronics and Optoelectronics integrated circuits lack some development aspects inside the MEO group and at DCM-CENIMAT/I3N and are crucial to boost the students' background. Targeting top level University, we aim the bridge research with teaching activity, in which the students will be fully engaged. To this I anticipate a strong success based on my previous experience in bringing students to innovative research.

My teaching experience started in 1989 as a monitor at the Materials Science Department of Faculty of Sciences and Technology of New University of Lisbon. Since then my academic career evolution followed the conventional steps: 1st stage assistant, assistant and after the PhD, assistant professor. Typically, according to the established Portuguese rules, a monitor supports the professors in the laboratorial classes, the assistants support the professors in the practical classes (both problems and labs) and only after PhD the responsibility for theoretical classes can be taken. Therefore after PhD I started to be responsible for the following courses:

1. SEMICONDUCTOR MATERIALS

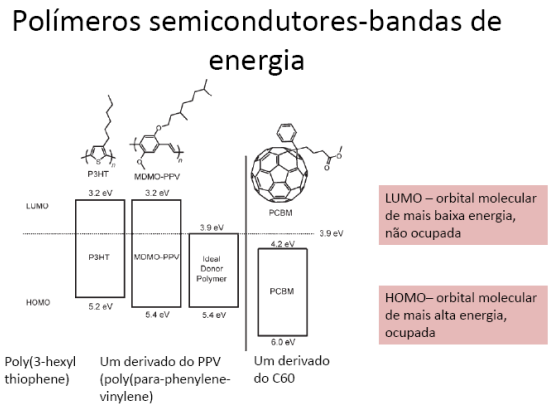
This is a course where the basic concepts of semiconductor materials are focused, supplying the grounds of students for both integrated master engineering courses under DCM responsibility: Micro and Nanotechnologies (*MIEMN*) and Materials Science (*MIEM*, as far as electronic materials are concerned). It starts with the physical principles of semiconductor materials and then the physical principle of basic electronic devices employing semiconductor materials such as pn and Schottky diodes, bipolar and unipolar transistors. At the end it is generically exemplified the application of the devices to electronic circuits.



Example of a lab report and a slide related with the metal oxide semiconductor structure.

2. MATERIALS FOR ENERGY CONVERSION AND CONSERVATION

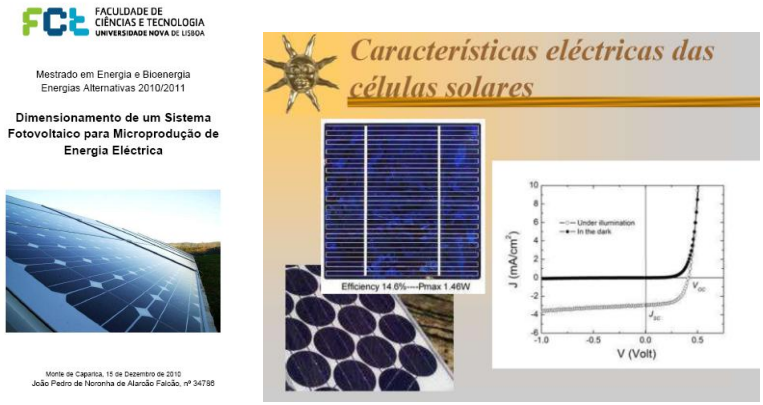
The structure of this course is of my responsibility and is mandatory in the curricula of Materials Science Engineering and optional in Micro and Nanotechnologies. It was reformulated from a previous course (conversion and conservation of energy) mainly related with photovoltaic energy. I kept that component but broad the field towards other processes of energy conversion. The photovoltaic component, besides crystalline and amorphous silicon solar cells, also includes organic, organic-inorganic (dye sensitized) and new concepts of solar cells. Materials for thermoelectrics conversion, hydrogen production, electrochemical conversion, and thermo-solar are other topics included in this course.



Example of a lab report and a slide of a class related with polymeric solar cells.

3. ALTERNATIVE ENERGIES

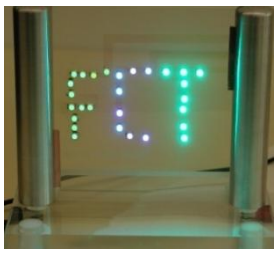
This course is given to the students of Master course in Bioenergy. I have been involved in the definition of the course, where the students end up with sizing of a PV plant chosen by them, after receiving the scientific understanding basis of photovoltaic. The students start to learn the physical principles of a solar cell (crystalline silicon); determine its current voltage characteristics; the physical efficiency limits of a solar cell and of a solar module; how the solar cells are made; sizing of modules; types of PV systems; the use of concentrators and of storage components in the PV systems.



Example of a PV sizing done by a student and a slide of a lesson about electrical characteristics of a solar cell.

4. OPTOELECTRONICS

Optoelectronics is a mandatory course for the Integrated master engineering in Micro and Nanotechnologies and optional for the Materials Science. In this course I included the components of basic principles of optics and lenses, working principle of optical fibres, LEDs and LASERs and Optoelectronics circuits (including waveguides). This course has a strong component of lab classes (almost all practical classes are given in Lab. environment) and under my guidance, the students have constructed the first wave guide, the first transparent lighting using commercial LEDs and transparent TCOs. The characterization of the devices and systems processed, such as characterization of LED and attenuation of an optical fibre are also done by the students. These lab classes are complemented with tutorial classes for the resolution of exercises.



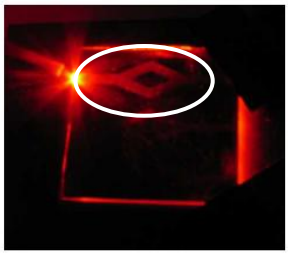


Photo of the LEDs transparent lighting and 1st thin films waveguide realized by the students

Two new courses given by the DCM have started this year, both under my responsibility/coordination (it is included a file with the course's responsibility and description, highlighted according to the submitted proposal of MIEM to A3S and MIEMN):

5. THIN FILM TECHNOLOGY

This is a running course (mandatory for MIEM and optional for MIEMN) also under my responsibility. The aim is to give the theoretical and practical technology formation of how to process thin and thick films, currently used either in electronics or for surface coatings, such as: sputtering (dc and rf), chemical vapor deposition, chemical vapor deposition assisted by rf; thermal evaporation and sol-gel spray pirolysis, laser assisted deposition. Examples of different types of coatings are given. The program concludes with the characterization techniques used to determine the structure, composition and physical properties.

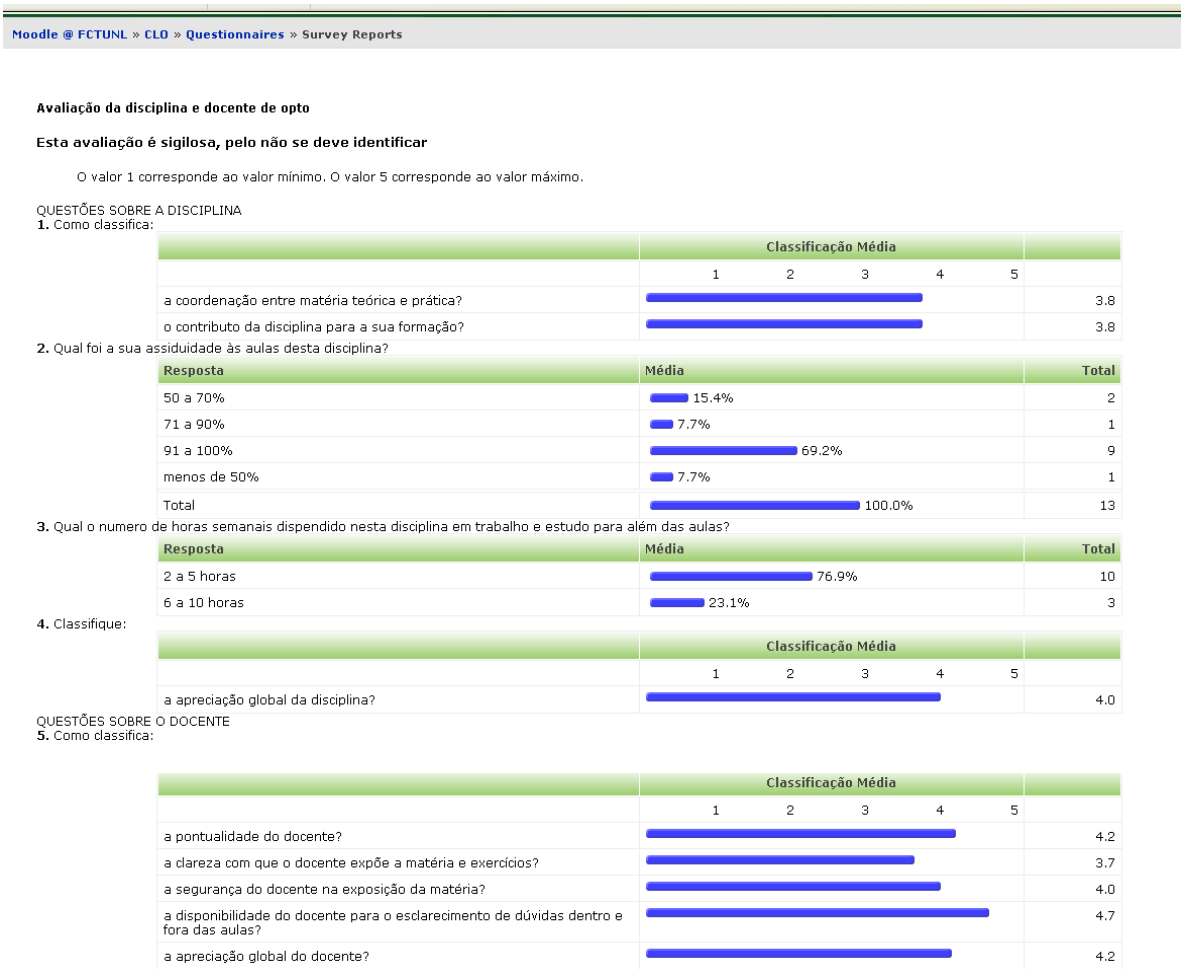
6. SURFACES AND INTERFACES

This is a new course introduced in the curricula of the recent approved Integrated Master course in Micro and Nanotechnologies Engineering. The course structure was proposed by me and the focus will be put on the following phenomena surface or interface related: capillarity; liquid / solid contact; wettability; contact angle; Generic adsorption; gas-solid adsorption; positive and negative adsorption; surface tension; surfactants, segregation; surface roughness; Solid-solid friction; Wear; analysis of organic and inorganic surfaces; coordination and atomic energy surface; surface tension anisotropy.

My teaching practice is to be a Professor that is there to help the students in acquiring not only the needed scientific knowledge, for their future professional skills, but also others capabilities, like to promote teamwork. Moreover, I am always available to discuss with students their ideas and doubts, either face to face or via e-mail. I think I got succeeded having the recognition by the students, as can been seen not only by their evaluation to my teaching performances but also by the number of Master Students that I supervised in the last 3 years. Considering that in the recent years the students of the final year of the Master course in Materials Engineering were less than 10, this evidences the great preference that they have in being supervised by me.

The [Integrated Master in Engineering of Micro and Nanotechnologies](), recently launched by the DCM brings new challenges for the teachers. As a new course is our main motivation ensure that the students will finish with a solid knowledge in the field of materials for nano/microelectronics and also on nanotechnologies but other skills must be develop like creative thinking, independency, practice of solving challenging problems and entrepreneurship.

Example of evaluation by the students.



Moodle @ FCTUNL » CLO » Questionnaires » Survey Reports

Avaliação da disciplina e docente de opto

Esta avaliação é sigilosa, pelo não se deve identificar

O valor 1 corresponde ao valor mínimo. O valor 5 corresponde ao valor máximo.

QUESTÕES SOBRE A DISCIPLINA

1. Como classifica:

	Classificação Média (1 2 3 4 5)	
a coordenação entre matéria teórica e prática?		3.8
o contributo da disciplina para a sua formação?		3.8

2. Qual foi a sua assiduidade às aulas desta disciplina?

Resposta	Média	Total
50 a 70%	15.4%	2
71 a 90%	7.7%	1
91 a 100%	69.2%	9
menos de 50%	7.7%	1
Total	100.0%	13

3. Qual o numero de horas semanais dispendido nesta disciplina em trabalho e estudo para além das aulas?

Resposta	Média	Total
2 a 5 horas	76.9%	10
6 a 10 horas	23.1%	3

4. Classifique:

	Classificação Média (1 2 3 4 5)	
a apreciação global da disciplina?		4.0

QUESTÕES SOBRE O DOCENTE

5. Como classifica:

	Classificação Média (1 2 3 4 5)	
a pontualidade do docente?		4.2
a clareza com que o docente expõe a matéria e exercícios?		3.7
a segurança do docente na exposição da matéria?		4.0
a disponibilidade do docente para o esclarecimento de dúvidas dentro e fora das aulas?		4.7
a apreciação global do docente?		4.2

Summary of the lectures given after PhD at Materials Science Department of FCT-UNL.

			Year									
			Old curricula			Curricula reformulated	Bolonha (1st+2nd cycle)				Bolonha (Integrated Master) Materials Engineering and Micro and Nanotechnologies	
Course	**Theory**	**Practice**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	**09/10**	**10/11**	**11/12**
Semiconductors Materials	X	X	6th S		6th S		5th S 1st Cycl.			SABTICS	**5th S**	
Solid State Electronics	X	X		4th S								
Conversion and conservation of Energy	X	X	7th S	7th S	7thS	5th S						
Optoelectronics	X	X				9th S						
Optoelectronic (module of **Liquid Crystals and Optoelectronics**)	X	X					1st S 2nd cycl.				**9th S**	
Ecomaterials _Responsible	X	X					2nd S 2nd cycl					
Thin Film Technologies (module of Advanced Laboratory Techniques)	X	X		8th S	8th S							
Materials for energy conversion and conservation (Optional) _Responsible	X	X					5th S 1st cycl.				**6th S**	
Alternative Energies	X	X					1th S 2nd cycl.					
Instrumentation techniques		X		5th S								
Thin Film Technologies												**MIEM 8th S**
Surfaces and Interfaces												**MIEMN 6th S**
SUPERVISION of MSc Thesis			**1**		**2**	**2**	**3**	**2**	**3**	**6**	**3**	**5**

1. SCIENTIFIC ACTIVITIES

1.1. PUBLICATIONS SUMMARY

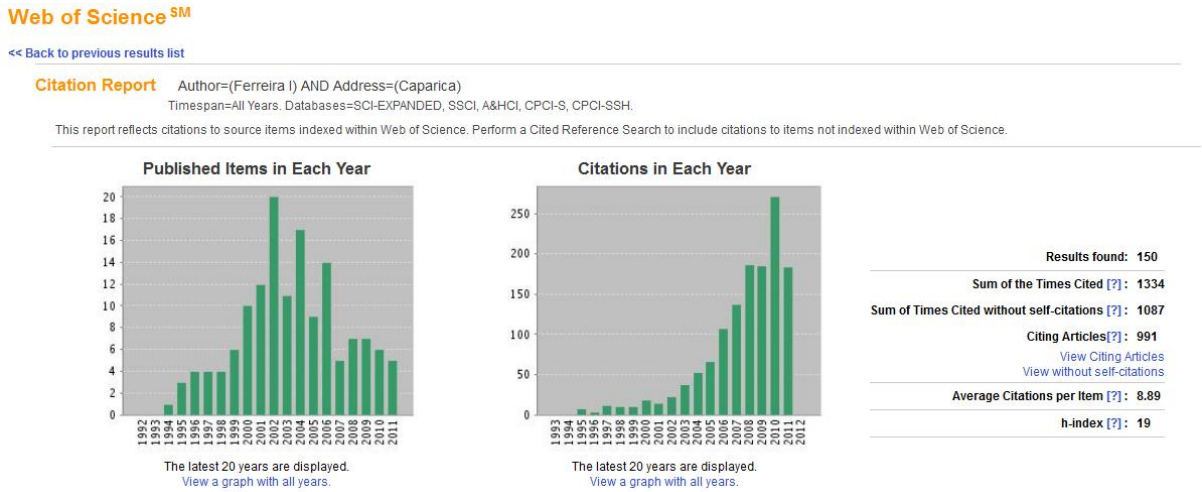
In the following is shown a summary of the publications obtained from the Web of Science. My scientific identification (Research ID) is also shown.

ResearcherID: G-3903-2011
E-mail: imf@fct.unl.pt

URL**: http://www.researcherid.com/rid/G-3903-2011**

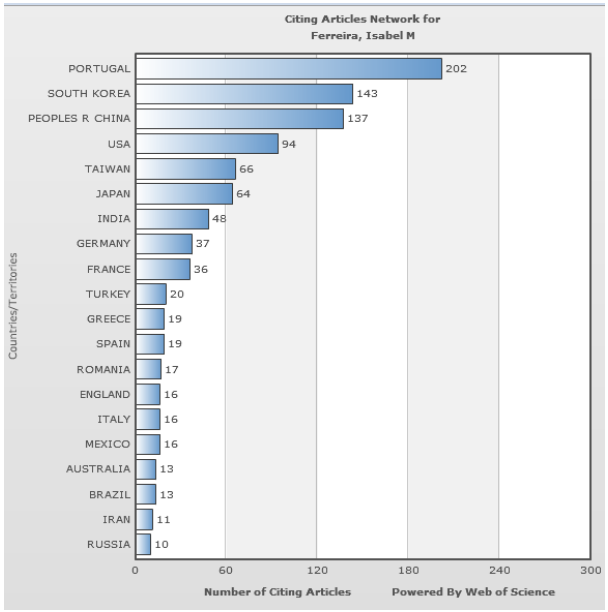
Subject: Engineering; Materials

Number of citations (**1334**), Average Citations (**8.89**) and h-index (**19**) *includes all papers of WoS*

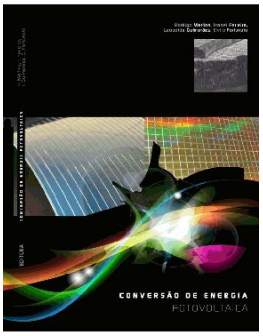


As observed by the evolution of citations after 2002 (PhD date) the number of citations increase exponentially revealing a good impact of the publications in the scientific community.

The citations are distributed worldwide as indicated in the following graph, where South Korea, China and USA, Taiwan and Japan are the countries of scientists recognizing our work. A note just to say that this is within the top number of citations in the field of thin films materials for electronic/optoelectronic applications.



1.2. BOOKS EDITION



1. R. Martins, **I. Ferreira**, L. Guimarães e E. Fortunato, A Conversão de Energia Fotovoltaica, Dossier e Porto Editora, 2012.
2. R. Martins, V. Chu, E. Fortunato, J. Conde, **I. Ferreira**, "Proceedings of the Twenty First International Conference on Amorphous and Nanocrystalline Semiconductors Science and Technology", Elsevier, **2006**.
3. II Advance Materials Science Forum, R. Martins, E. Fortunato, **I. Ferreira** e C. Dias, Trans Tech Publications, (**2004**).

1.3. BOOKS CHAPTER

1. E. Fortunato, **I. Ferreira**, R. Martins, "Zinc oxide Thin Films Applied to UV light and Ozone Sensors", in Encyclopedia of Sensors, in American Scientific publishers, edited by C.A. Grimes, E.C. Dickey and M.V. Pishko and forwarded by Professor Rudolph A. Marcus, Nobel prize laureate in Chemistry. Vol.10 (**2006**), pp. 501-515.
2. E. Fortunato, L. Pereira, H. Águas, **I. Ferreira**, R. Martins. "Flexible a-Si:H Position Sensitive Detectors", in special issue on Flexible, Electronics Technology, edited by Arokia Nathan and Babu Chalama, Proc. IEEE, 93 (7), (**2005**) pp. 1281-1286.
3. R. Martins, **I. Ferreira**, E. Fortunato e L. Guimarães. "Materiais e Dispositivos Fotovoltaicos". "Os Materiais dos Anos 2000", edts P.J. Ferreira e M.A. Fortes, IST press pp. 305-316 (**2003**).

1.4. SELECTED PUBLICATIONS

The following publications were selected from the list shown in 1.7 List of publications because they represent the different activities that are under my direct supervision.

		Impact factor	Times cited
1	Martins R, Nathan A, Barros R, Pereira L., Barquinha P., Correia N., Costa R., Ahnood A., **Ferreira I.**, Fortunato E., Complementary metal oxide semiconductor technology with and on paper, Advanced Materials, 23 (2011) 4491	10.88	
2	Neves Nuno M., Barros Raquel X., Antunes Elsa M., **Ferreira Isabel M.**, Calado João M., Fortunato Elvira M. and Martins Rodrigo F., Sintering behavior of nano- and micro-sized ZnO powder targets for rf magnetron sputtering applications, Journal of the American Ceramic Society, 1–7 (2011),DOI: 10.1111/j.1551-2916.2011.04874.x	2.169	
3	Soares Paula I. P., **Ferreira Isabel M. M.** *, Igreja Rui A. G. B. N., Novo Carlos M. M. and Borges João P. M. R., Application of Hyperthermia for Cancer Treatment: Recent Patents Review Recent Patents on Anti-Cancer Drug Discovery, 2012, 7, 000-000	2.368	
4	Aguas H.; Ram, SK; Araujo, A; Gaspar, D; Vicente, A; Filonovich, SA; Fortunato, E; Martins, R; **Ferreira, I.** Silicon thin film solar cells on commercial tiles, ENERGY & ENVIRONMENTAL SCIENCE (4) 11 (2011) 4620-4632 DOI: 10.1039/c1ee02303a	9.488	
5	Baptista, AC; Martins, JI; Fortunato, E; Martins, R; Borges, JP; **Ferreira, I**, Thin and flexible bio-batteries made of electrospun cellulose-based membranes, BIOSENSORS & BIOELECTRONICS (26) 5 (2011) 2742-2745 DOI: 10.1016/j.bios.2010.09.055	5.361	
6	**Ferreira, I**; Bras, B; Martins, JI; Correia, N; Barquinha, P; Fortunato, E; Martins, R. Solid-state paper batteries for controlling paper transistors, ELECTROCHIMICA ACTA (56) 3 (2011) 1099-1105, DOI: 10.1016/j.electacta.2010.10.018	3.650	2
7	**Ferreira I**, Brás B, Correia N, Barquinha P, Fortunato E, and Martins R, Self-Rechargeable Paper Thin-Film Batteries: Performances and Applications, JOURNAL OF DISPLAY TECHNOLOGY (6) 8 (2010) 332-335 DOI: 10.1109/JDT.2010.2056672	1.695	
8	Javier Contreras , Daniel Costa, Sonia Pereira, Elvira Fortunato, Rodrigo Martins, Rafal Wierzbicki, Holger Heerlein and **Isabel Ferreira** Micro Cantilever Movement Detection with an Amorphous Silicon Array of Position Sensitive Detectors, *SENSORS (10) 9 (2010) 8173-8184 DOI: 10.3390/s100908173 Published: SEP 2010*	1.774	1

1.5. PATENTS

1. PAT 103670 C ., "***Fabrication process of covalent semiconductors-ionic oxide semiconductors heterojunctions and their applications in optoelectronic devices, including solar*** " - R. Martins, **I. Ferreira** and E. Fortunato

2. 103936 U/PT, 21-01-2008 - "***Development of a method to operate Tunable Color Sensors in order to achieve the maximum accuracy in detecting the color of a light beam***", National-UNL, Rodrigo Martins, Elvira Fortunato, **Isabel Ferreira**, Alberto Tagliaferro.

3. PAT 40718/09, 104766, 29/09/2009, FCT/UNL, ***Dispositivo de produção e/ou armazenamento de energia baseado em fibras e filmes finos***, Rodrigo Martins, Elvira Fortunato, **Isabel Ferreira**, João Borges, Ana Baptista, Bruno Brás.

4. PPI 40993/09 Device for energy Production and/or storage based in fibers and thin films Rodrigo Martins, Elvira Fortunato, **Isabel Ferreira**, João Borges, Ana Baptista, Bruno Brás.

5. PAT 104635/09 "Dispositivo electrocrómico e método para a sua produção "***Electrochromic device and method for its production***", **Isabel Ferreira**; Claúdia Costa; Elvira Fortunato; Rodrigo Martins; Inês Henriques *also under international submission.*

6. PAT 41758/10 - Azulejos, telhas mosaicos e revestimentos cerâmicos fotovoltaicos, ***"Photovolotaics ceramics, tiles and ceramics covers"*** R. Martins, **I. Ferreira**, E. Fortunato, H. Águas, L. Gomes, V. Teixeira

1.6. COMMUNICATIONS

1.6.1. INVITED COMMUNICATIONS IN THE LAST 3 YEARS

2012

1. R. Martins, **I. Ferreira**, E. Fortunato, "The present status of development of paper electronics", SPIE West Photonics Oxide-based Materials and Devices III (conference 8363), January 22-25, 2012, S. Francisco, USA

2. R. Martins, **I. Ferreira**, E. Fortunato, "'Paper electronics: from Field Effect Transistors to all Solid State Batteries", CMOS Emerging Technologies Conference, July 18-20, 2012, in Vancouver, BC, Canada

2011

1. R. Martins, E. Fortunato, **I. Ferreira**, 100% Green Electronics, IEEE, Advancing Technologies for Humanity, Millenium conferences, 21st March 2011, Caparica Portugal

2. R. Martins, **I. Ferreira**, E. Fortunato, "Paper electronics: The Green electronics for the Future", Institute of Physics and Materials, Bucharest, 11th October 2011.

3. **I. Ferreira**, E. Fortunato, R. Martins "Solid State Paper Battery", MRS Fall Meeting, Symposium F: Mobile Energy, 28 November – 2 December 2011, Boston, Massachusetts.

4. R. Martins, **I. Ferreira**, E. Fortunato, The paper electronics: from circuit board substrate to integrate harvesting devices", chair and invited speaker of the 6th International Conference of the Africa Materials Research Society, 11-16 December 2011, Victoria Falls, Zimbabwe.

2010

1. R. Martins, **I. Ferreira**, "A (R)Evolução esperada na conversão de energia de origem fotovoltaica, Workshop em Energia e Biomassa organizada pela Rede de Competências em Tecnologias de Energias Renováveis, 26 de Fevereiro de 2010, Universidade do Minho.

2. R. Martins, **I. Ferreira**, E. Fortunato, Green electronics for the future, 3rd International Conference on Advanced Nano Materials, ANM2010, 12-15 September 2010 - Agadir, Morocco.

3. R. Martins, **I. Ferreira**, L. Pereira, P. Barquinha, G. Gonçalves, N. Correia, E. Fortunato, A electronica de e com papel, workshop da JSPM, IST, 12 Novembro de 2010,

4. R. Martins, **I. Ferreira**, E. Fortunato, "Green Electronics for the Future: The paper electronics", 2010 International Chemical Congress of Pacific Basin Societies, Area 9 Materials and Technologies, December, 15-20, 2010, Honolulu, Hawaii, USA.

2009

1. R. Martins, L. Pereira, P. Barquinha, **I. Ferreira**, R. Prabakaran, G. Gonçalves, A. Gonçalves, E. Fortunato, "Role of order and disorder in covalent semiconductors and ionic oxides used to produce thin film transistors." Zinc oxide and related compounds: order within the disorder, Zinc Oxide Materials and Devices; Conference, OPTO 2009, organized by SPIE, Photonics West, S. José, 24-29 January 2009, USA.
2. R. Martins, **I. Ferreira**, E. Fortunato, Novas Formas de Conversão de Energia Fotovoltaica, 17 de Abril de 2009, conferência, no Comando da Logística (Edifício CEUTA, Av. Infante Santo, 49, 6.º Piso, Lisboa), invited by Quartel-Mestre General (Comandante da Logística do Exército), Tenente-General Joaquim Formeiro Monteiro.
3. R. Martins, **I. Ferreira**, E. Fortunato, Novas Formas de Conversão de Energia Fotovoltaica: Revestimentos Cerâmicos Fotovoltaicos, 7 de Maio de 2009, JORTEC, FCTUNL, Caparica
4. R. Martins, I. Ferreira, E. Fortunato, A Conversão de energia Fotovoltaica: Novos desafios, 13 de Maio de 2009, Rotary Club do Entrocamento, Golegã, Portugal.
5. R. Martins, L. Pereira, P. Barquinha, **I. Ferreira**, N. Correia, E. Fortunato, "Self sustained n-type memory transistor devices based on natural cellulose paper fibers", International Meeting on Information Display, IMID 2009, October 12-16, 2009 / KINTEX, Korea.

1.6.2. ORAL AND POSTER COMMUNICATIONS

1. A.C. Baptista, J.P. Neto, J.I. Martins, E. Fortunato, R. Martins, J.P. Borges and **I. Ferreira**; Polymeric electrospun membranes for bioelectrochemical devices. **Hybrid Materials** 2011, 6-10 March 2011, Strasbourg, France. **Poster**
2. A.C. Baptista, J.P. Neto, J.I. Martins, E. Fortunato, R. Martins, J.P. Borges and **I. Ferreira**; Flexible and lightweight bioelectrochemical devices based on electrospun membranes. EMRS-FALL MEETING 2011, 19-23 September 2011, Warsaw, Poland**. Oral**
3. Martins, R.; Pereira, L.; Barquinha, P.; Correia, N.; Gonçalves, G.; **Ferreira, I**.; Dias, C.; Fortunato, E., Floating gate memory paper transistor. **SPIE - The International Society for Optical Engineering** 2010, 7603. **Oral**
4. Martins, R.; Pereira, L.; Barquinha, P.; **Ferreira, I**.; Prabakaran, R.; Gonçalves, G.; Gonçalves, A.; Fortunato, E., Zinc oxide and related compounds: Order within the disorder. **SPIE - The International Society for Optical Engineering** 2009, 7217. **Oral**
5. R. Prabakaran, T. Monteiro, M. Peres, F.M. Braz Fernandes, E. Fortunato, R. Martins and ***I. Ferreira,*** Photoluminescence investigations of ZnO films coated porous silicon using rf magnetron Sputtering for optoelectronic device application - ***European Research Materials Symposium*** - May 2007 – Strasbourg- ***Poster***

NANOSMAT – International Conference on Surface Coatings and Nanostructured Materials – July 2007

6. R. Prabakaran, E. Fortunato, R. Martins and ***I. Ferreira,*** Visible light emission from nanostructured SiCN films produced by HWCVD technique - ***Poster***
7. R. Prabakaran, R. Kesavamoorthy, C.S. Sundar, V.S. Sastry, E. Fortunato, R. Martins and ***I. Ferreira,*** Effects of copper phthalocyanine coating on the photoluminescence properties of porous silicon - ***Oral***
8. R. Prabakaran, R. Kesavamoorthy, E. Fortunato, R. Martins and ***I. Ferreira,***Raman and spectroscopic ellipsometry studies on silicon nanostructured films - ***Oral***
9. R. Prabakaran, E. Fortunato, R. Martins and ***I. Ferreira,*** Nanoporous silicon to ozone and UV detection - ***Poster***
10. ***Isabel Ferreira***[1], Elvira Fortunato and Rodrigo Martins, Nanoporous A/Nc-Si:H Films For Fuel Cell Applications - ***Oral***
11. ***Ferreira***, L. Pereira, A. R. Ramos, E. Alves, E. Fortunato and R. Martins, Ni Induced Growth Of Crystalline Silicon Nanowires By Lp-Cvd - *Oral*

ICANS – International Conference on Amorphous and Nanocrystalline Semiconductors –Agosto 2007 – USA

12. R. Prabakaran, E. Fortunato, R. Martins and ***I. Ferreira***,Investigation of hydrocarbon coated porous silicon using HWCVD technique to detect CO_2 and H_2 gases -***oral***
13. R. Prabakaran, H. Aguas, E. Fortunato, R. Martins and ***I. Ferreira***,n-PS/a-Si:H heterojunction for device application - ***oral***
14. R. Prabakaran, E. Fortunato, R. Martins and ***I. Ferreira,*** Fabrication and characterization of hybrid solar cells based on copper phthalocyanine/porous silicon - ***poster***
15. R. Prabakaran, E. Fortunato, R. Martins and ***I. Ferreira,***The effects of different passivating layers on the photoluminescence properties of porous silicon for the advanced optoelectronic devices - ***oral***
16. L. Raniero, I. Ferreira, H. Águas, E. Fortunato and R. Martins, "Nanostructured Silicon Films Applied to pin Solar Cells", ICOOPMA-2006, chaired by Jai Singh, Charles Darwin University, Darwin Australia, 16-20 July 2006, OL37. ***Oral***
17. P. Prabakaran, I. Ferreira, T. Monteiro, A.F. da Cunha, M. Peres, Z. Hu, H. Águas, A. Gonçalves, E. Fortunato, R. Martins, "Optical and structural analysis of ZnO:Ga films coated porous silicon using rf magnetron sputtering- a reality towards optoelectronic devices", session C4, 1st International symposium on transparent conductive oxides, 23-25 October 2006, Crete- Greece, p-40. ***Oral***
18. L. Raniero, I. Ferreira, H. Águas, S. Zhang, E. Fortunato and R. Martins. "Study of a-SiC:H buffer layer on nc-Si/a-Si:H solar cells deposited by PECVD technique". IEEE 31st Photovoltaic Specialists Conference and Exhibition, Orlando, USA, January, 3-7, 2005. *Poster*.

19. R. Martins, E. Fortunato L. Raniero, I. Ferreira, A. Marques, "MIS 3D position sensitive detectors". TO 1.025, p.27. Materiais 2005, III IMS, Aveiro 20-23 March 2005. *Oral*.
20. Ferreira I, E. Fortunato, P. Vilarinho, R. Martins, "Silicon carbide obtained by HWCVD technique". TO1 P.88, p.135. Materiais 2005, III IMS, Aveiro 20-23 March 2005. *Poster*.
21. L. Raniero, E. Fortunato, A. Gonçalves, I. Ferreira, A. Pimentel, S. Zang, R. Martins, "Hydrogen plasma influence on electrical and optical properties of ZnO:In transparent conductive oxides". TO1 P.95, p.138. Materiais 2005, III IMS, Aveiro 20-23 March 2005. *Poster*.
22. S. Zhang, L. Raniero, E. Fortunato, L. Pereira, H. Águas, I. Ferreira and R. Martins. "Amorphous silicon based p-i-n structure for color sensor". A9.5 (poster), p. 62. MRS, Spring Meeting, Symposium A, S. Francisco (USA), March 28-April 1 2005. *Poster*.
23. L. Raniero, A. Gonçalves, A. Pimentel, I. Ferreira, S. Zhang, L. Pereira, H. Águas, E. Fortunato and R. Martins. "Influence of Hydrogen Plasma on electrical and optical properties of transparent conductive oxides". A21.10 (poster), p. 66. MRS, Spring Meeting, Symposium A, S. Francisco, (USA)March 28-April 1 2005. *Poster*.~
24. Ferreira, L. Raniero, R. Igreja, A. Pimentel, A. Gonçalves, E. Fortunato, R. Martins, "In-situ Spectroscopic Impedance of Different Transparent Conductive Oxides before and After sustaining Hydrogen Plasma", D2.10 (oral). MRS, Spring Meeting, Symposium D, Materials integration and technology for monolithic Instruments S. Francisco (USA), March 28-April 1 2005. *Oral*
25. L. Raniero, I. Ferreira, H. Águas, S. Zhang, E. Fortunato and R. Martins. "nc-Si/a-Si:H Solar Cells Deposited by Plasma enhanced Chemical Vapour deposition Technique at 27.12 MHz". F/PI.06, p. F-4/21. EMRS, Spring Meeting, Symposium F, Strasbourg (França), 31- June 3, 2005. *Poster*.
26. S. Zhang, X. Liao, L. Raniero, E. Fortunato, Y. Xu, G. Kong, H. Águas, I. Ferreira and R. Martins. "Silicon Thin films Prepared in the Transition Region and their use in Solar Cells". F/PI.10, p. F-4/21. EMRS, Spring Meeting, Symposium F, Strasbourg (França), 31- June 3, 2005. *Poster*.
27. N. Martins, P. Canhola, L. Raniero, S. Zhang, M. Quintela, E. Fortunato, I. Ferreira and R. Martins. "Performances of an-in-line PECVD System Used to Produce High Efficiency Polymorphous/Nanocrystalline Silicon Solar Cells". F/PII.03, p. F-9/21. EMRS, Spring Meeting, Symposium F, Strasbourg (França), 31- June 3, 2005. *Poster*.
28. *Ferreira I.*, L. Raniero, E. Fortunato and R. Martins. "Electrical Properties of Amorphous and nanocrystalline Hydrogenated silicon Films obtained by Impedance spectroscopy". F/PIII.04, p. F-16/21. EMRS, Spring Meeting, Symposium F, Strasbourg (França), 31- June 3, 2005. *Poster*.
29. *Ferreira*, E. Fortunato, P. Vilarinho and R. Martins. "Hydrogenated Silicon Carbon Nitride Films Obtained by HWCVD Technique". MO7.3, p. 24, ICANS 21, Lisbon (Portugal), 4-9 September, 2005. *Oral*.
30. J. Contreras, I. Ferreira, D. Costa, S. Pereira, H. Águas, C. Baptista, E. Fortunato, R. Martins, R. Wierzbiki, H. Heerlein. "Amorphous Silicon Position Sensitive Detectors Applied to Micropositioning". TP4.12, p. 176, ICANS 21, Lisbon (Portugal), 4-9 September, 2005. *Poster*.
31. S. Zhang, L. Pereira, Z. Hu, L. Raniero, E. Fortunato, I. Ferreira, A. Pimentel and R. Martins. "Characterization of Nanocrystalline Silicon Carbide Films". ThP1.8, p. 288, ICANS 21, Lisbon (Portugal), 4-9 September, 2005. *Poster*.
32. . Martins, P. Barquinha, L. Pereira, A. Pimentel, P. Almeida, I. Ferreira, E. Fortunato. "Electron Transport in Amorphous Indium Zinc Oxide Films". ThP2.30, p. 328, ICANS 21, Lisbon (Portugal), 4-9 September, 2005. *Poster*.
33. L. Raniero, E. Fortunato, I. Ferreira and R. Martins. "Study of Losses on Nanostructured Silicon Solar Cells by Spectroscopic Impedance techniques". ThP4.9, p. 394, ICANS 21, Lisbon (Portugal), 4-9 September, 2005. *Poster*.
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1.7. List of Publications in the Science Citation Index - ISI

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2. SCIENTIFIC LEADERSHIP

As referred in the research statement I'm currently coordinating 2 industrial projects, 1 basic research and 1 European project in a total amount of 1,4 M€. The team that I coordinated is constituted by Pos-docs (1), PhD students (7) , MSc students (5) and researchers fellows (4).

In the following I summarize my involvement in supervision and in projects either as coordinator or as team member.

2.1. POS-DOC AND PHD SUPERVISION

Pos-Doc SUPERVISION

Joana Loureiro (NANOTEG project Grant) - PhD in Physics Technologic from IST in 2011, development of thin film thermoelectric materials

Rathinasamy Prabakaran (FCT grant 2005/2009): - PhD in Physics from University of Loyola, Chennai, India, developed work in the field of Porous silicon and its applications to devices.

PhD SUPERVISION

Started in 2011

1. Helena Orvalho: ***Electrochromic organic solar cells***; Fraunhofer-Institut für Solare Energiesysteme ISE; Supervisors Thomas Kroyer and *Isabel Ferreira*
2. Paula Soares: ***Membranes with magnetic nanoparticles for cancer treatment***; Supervision João Paulo Borges and *Isabel Ferreira (FCT grant)*
3. Ana Baptista: Produção de bio-baterias para aplicações médicas_**Production of bio-batteries for medical applications;** CENIMAT. *Supervisors: Prof. Isabel Ferreira and Prof. João Paulo Borges (FCT garnt)*

Started in 2010

4. José Lima de Oliveira: Integração de sistemas de energias renováveis para a produção autónoma de energia_**Integration of Renewable energy systems for autonomous energy production;** CENIMAT, *Supervisors: Prof. Isabel Ferreira and Prof. Rodrigo Martins*
5. Nuno Neves: Produção e caracterização de alvos feitos com nanopós e sua aplicação em sistemas de pulverização catódica _ **Production and characterization of targets made with nanopowders for application in sputtering systems;** INNOVNANO. *Supervisors: Prof. Isabel Ferreira and Elsa Antunes (enterprise)*
6. Carlos Teixeira: Células solares híbridas em substratos flexíveis_ **Hybrid solar cells in flexible substrates;** CENIMAT, *Supervisors: Prof. Isabel Ferreira and Prof. João Paulo Borges (own grant)*

Started in 2009

7. Javier Contreras: **Development of sensor systems for 3D objects recognition;** CENIMAT. *Supervisors: Prof. Isabel Ferreira and Prof. Rodrigo Martins (FCT grant)*

2.2. MSc SUPERVISION

LIST OF MSc THESIS

Name	Title	Local	Grade	Supervisors
2011/2012				
Carla Duque	Thermoelectric thin films elements (*from Energy master course of DEE*)	CENIMAT-DCM	Nov. 2011	Prof. Isabel Ferreira and Prof. Ventim Neves
Hugo E. G. M. da Costa	*Building Integrated Photovoltaics: An overview on concerns, sustainability and future solutions* (*from Energy master course of DEE*)	CENIMAT-DCM	Nov.2011	Prof. Isabel Ferreira and Prof. Ventim Neves
Ana Carina Baeta Manjua	*Membranas Fluorescentes para fototerapia regenerativa (Biomedics, Integrated Master course of DF)*	CENIMAT-DCM	Jan. 2012	Prof. Isabel Ferreira and Prof. Joao Paulo Borges
Ana Maria Rodrigues Alves	Biodispositivos electrónicos implantáveis e biodegradáveis *(Biomedics, Integrated Master course of DF)*	CENIMAT-DCM	Jan. 2012	Prof. Isabel Ferreira and Prof. Joao Paulo Borges
Alexandre Manuel Pedroso Botas	Desenvolvimento de nanopartículas magnéticas à base de quitosano para o tratamento do cancro por hipertermia *(Biomedics, Integrated Master course of DF)*	CENIMAT-DCM	Jan. 2012	Prof. Isabel Ferreira and Prof. Joao Paulo Borges
2010/2011				
Ana Raquel Vitorino	Thermal studies in solar cells for concentrators (DCM)	MAGPOWER, Lisbon	Dec 2011	*Prof. Isabel Ferreira and* MSc Antonio Sobral
Hugo Fernandes	Thermal energy recovery in PV concentrators systems (DCM)	MAGPOWER, Lisbon	Dec 2011	*Prof. Isabel Ferreira and* MSc Antonio Sobral
Joao Rafael Santos	Production of thermochromic/ thermoelectric thin film devices (DCM)	CENIMAT	Nov 2011	*Isabel Ferreira*
2009/2010				
Adriana Nogueira	*Production and characterization of thermoelectrics/thermochromics materials (DCM)*	CENIMAT	18/20	*Isabel Ferreira*
Joana Pereira	Characterization of TiO_2 nanopowders envisaging toxicology studies (DCM)	CENIMAT	17/20	*Isabel Ferreira*
Jair Marques	Monitoring and optimization of the energy produced by photovoltaic systems (DCM)	ISEL/CENIMAT	2011	*Isabel Ferreira* and Lima de Oliveira (ISEL)
Joana Neto	Production of bio-batteries for medical applications *(Biomedics, Integrated Master course of DF)*	CENIMAT	18/20	*Prof. Isabel Ferreira and Prof. João Paulo Borges*
Tiago Mateus	*Optimization of Si-a solar panels(DCM)*	Solar Plus, Portugal	17/20	*Isabel Ferreira and* Henrique Castro
Mario Guimarães	Monitorization of PV systems based on amorphous silicon technology (MIEMN - DCM)	Solar Plus, Portugal	18/20	*Isabel Ferreira and* Henrique Castro
2008/2009				
Diana Gaspar	Development of solar cells based on nanostrucured Si for application in solar tiles (DCM)	CEMOP-UNINOVA	18/20	*Prof. Isabel Ferreira and* Prof. Hugo Águas
Bruno Brás	Thin Film paper batteries and applications to thin film transistors, Has got the 3th place in the contest of "Best probation in Materials Engineering at National level" (DCM)	CENIMAT	20/20	*Prof. Isabel Ferreira*
Ana Baptista	Production of Bio-batteries using membranes obtained by electrospinning, Has got the 1st place in the contest of "Best probation in Materials Engineering at National level" (DQ)	CENIMAT	19/20	*Prof. Isabel Ferreira and Prof. João Paulo Borges*
2007/2008				

Helena Orvalho	Determination of hydrogen permeation through parabolic trough absorbers and the influence of barrier coatings (DCM)	SCHOTT, Germany	18/20	*Prof. Isabel Ferreira and* Dr. Kamel Silmy (enterprise)
Sofia Carvalho Garvão	"Development of a new selective absorber coating system for parabolic trough receiver via magnetron sputter" (DCM)	SCHOTT Germany		*Prof. Isabel Ferreira and* Dr. Kamel Silmy (enterprise)
2006/2007				
José Carlos Valadas	*Production and characterization of electrochromic windows. (Honour mention-3th classification in the contest of Jornadas do Mar -Escola Naval, 2008) DCM*	CENIMAT/ CEMOP	17/20	Prof. Isabel Ferreira and Prof. Elvira Fortunato
Lúcia Gomes	*Production and characterization of semi-transparent solar cells- (Honour mention)-2th classification in the contest of Jornadas do Mar -Escola Naval, 2008) DCM*	CENIMAT/ CEMOP	18/20	Prof. Isabel Ferreira and Prof. Hugo Águas
Tânia Silva	*Photovoltaic systems: analysis of acquired data and of working problems-DCM*	EDP (INOVAÇÃO) - Lisboa	16/20	Prof. Isabel Ferreira and Engº João Maciel
2005/2006				
Carla Sofia Carrelo Marinho	*Selective absorbing surfaces with organic pigments*, DCM	INETI-Renwable Energy	16/20	Prof. Isabel Ferreira and Dr Clarisse Nunes
Tânia Sofia Rodrigues Cardoso	*Recycling wind generators and parks: recovering and reprocessing materials at end life cycle of systems*. DCM	INETI - Renwable Energy	17/20	Prof. Isabel Ferreira and Dr Ana Estanqueiro
2004/2005				
Raquel Nogueira	*Anemometric of metallic mast: degradation of materials by corrosion*, DCM	INETI-Renwable Energy Dep.	17/20	Prof. Isabel Ferreira, Drª Ana Estanqueiro
Sílvia Malcato	*Project and selection of materials to a low cost rotor for wind generator*, DCM	INETI-Renwable Energy Dep.	17/20	Prof. Isabel Ferreira e Drª Ana Estanqueiro
2002/2003				
Pedro Percheiro	*Behaviour of powders with high CV in mass production DCM*	EPCOS-Évora	16/20	*Prof. Isabel Ferreira*, Engº João Pedroso

2.3. SUMMARY OF THE INVOLVEMENT IN PROJECTS

TYPE	TITLE	DURATION	PARTNER	FINANCED BY	BUDGET (€)
2.3.1. COORDINATION OF PROJECTS					
INDUSTRIAL	NANOXIDES-"NEW NANOXIDES COMPOSITES TO PRODUCE TARGETS FOR PASSIVE AND ACTIVES APPLICATIONS IN OPTO-MICRO-NANO-ELECTRONICS"	2009-2011	INNOVNANO, CENIMAT	QREN Nº 3454	393 328
	NANOSI-PVCELLS -"DEVELOPMENT OF PHOTOVOLTAIC DEVICES BASED ON NANOSTRUCTURED SILICON"	2009-2011	SOLARPLUS, CENIMAT	QREN Nº 5610	219 385
BASIC RESEARCH	NANOTOX-"INTEGRATED EVALUATION OF NANOMATERIALS: DETERMINATION AND CHARACTERIZATION OF THE ENVIRONMENTAL TOXICOLOGY"	2010-2012	LNEG; FCT-UNL (CENIMAT*+DQ); HCC (CURRY CABRAL HOSPITAL); IMAR	PTDC/CTM/099446/2008	48 890
	"ÓXIDOS MULTIFUNCIONAIS: NOVA APROXIMAÇÃO À INTEGRAÇÃO A BAIXA TEMPERATURA DE ÓXIDOS SEMICONDUTORES COMO FILMES FINOS ACTIVOS E PASSIVOS NA NOVA GERAÇÃO DE SISTEMAS ELECTRÓNICOS – MONALISA"	2007-2009	CEMOP/UNINOVA; CENIMAT AND CEOT (U. ALGARVE)	PTDC/CTM/73943/2006	124 790

EU	NANOSTRUCTURED THERMOELECTRIC SYSTEMS FOR GREEN TRANSPORT & ENERGY EFFICIENT APPLICATIONS- NANOTEG	2011-2014	Thales SA, Thales Avionics SA THAV, Ecole Centrale Paris - Lab. d'Energétique Moléculaire Macroscopique, Combustion, Commissariat à l'Energie Atomique et aux Energies Alternatives-LITEN, CEA, Schneider Electric Industries SAS S-E France; Micropelt GmbH MP Germany, Panco GmbH Germany, Catalan Institute of Nanotechnology ICN Spain, Cidete Ingenieros SL CIDETE Spain, Centro Ricerche Fiat SCPA CRF Italy, Uninova - Instituto de Desenvolvimento de novas tecnologias UNINOVA Portugal	ENIAC-2010-1	338 846
	"ADVANCED HANDLING AND ASSEMBLY IN MICROTECHNOLOGY- ASSEMIC	2003-2007	U. VIENA (AT) COORDENADOR; FSRM (CH); ARC (DE); IMT (RO); WUT (PL); UNINOVA (PT); AMIR (DE); ROBOTIKER (SE); FORTH-HELLAS (GR); MEDPLANT GENETICS + PROTEOMICA (SE); RAL-CCLRC (UK); FRAUNHOFER INSTITUT FÜR LASERTECHNIK – ILT (DE); SSSA (IT); NASCATEC (DE).	6TH UE PROGRAMME, MARIE CURIE ACTIONS: RESEARCH TRAINING NETWORKS, PROPOSAL Nº 504826	285 000
IND. CONTRACT	"TESTS AND VALIDATION OF AMORPHOUS SILICON SOLAR CELLS"	2007-2008	CENIMAT-SOLARPLUS	SOLAR PLUS	187 500
				TOTAL	1 597 739

2.3.2. PARTICIPATION AS RESEARCHER

INTERNATIONAL	"MATERIALS ENGINEERING AND PHYSICS OF QUASIMORPHOUS SILICON THIN FILMS FOR ITS APPLICATION IN LARGE AREA ELECTRONICS".	2002-2006	CEMOP/ UNINOVA (COORDINATOR), CENIMAT, PHYSICS DEPT OF SYRACUSE UNIVERSITY, USA.	FLAD (PROJECTO 85/02)	165 000
INDUSTRIAL	SOLARTILES	2009-2011	DOMINÓ SA;J. COELHO DA SILVA, SA; CTCV; INETI -; CENIMAT/FCT/UNL - CENTRO VIRIS, NATURA E AMBIENTE SA	QREN Nº 3380	190 452
	"YINVISIBLE – YTSHIRT-TÊXTIL"	2006-2008	YDREAMS; FCT/DQ; FCT – DCM/CENIMAT; FÁBRICAS DE MALHAS FILOBRANCA, S.A..TOTAL	ADI/IDEIA/2006	85 837
	"YINVISIBLE – BOARDS"	2006-2008	YDREAMS; FCT – DQ; FCT – DCM/CENIMAT; BI-SILQUE SA	ADI/IDEIA/2006	126 109
	"YINVISIBLE – PAPER"	2006-2008	YDREAMS; FCT-DQ; FCT-DCM/CENIMAT RENOV, ALMONDA, S.A. TOTAL.	ADI/IDEIA/2006	121 883
	"DEVELOPMENT OF INFRA-RED DETECTORS BASED ON CRYSTALLINE SILICON TECHNOLOGY- IRS".	2003-2007	UNINOVA/CEMOP (COORDINADOR) + CENIMAT+CSP	POE, REF. 03/00198.	471 209
	"1024 ARRAY OF LINEAR POSITION SENSORS FOR OPTICAL CAMERA INSPECTIONS - SENSIT"	2003-2007	UNINOVA/CEMOP (COORDINADOR), CENIMAT AND TEKELEC.	POE, REF. 03/00197.	525 000
	"SOLID STATE TIME METER – METES"	2002-2005	TEKELEC (COORDINATOR), CENIMAT AND UNINOVA/CEMOP.	POSI/6250-2002/2005	195 600
BASIC RESEARCH	TRANSITORES DE FILME FINO ELECTROCROMICOS PARA APLICAÇÃO EM JANELAS INTELIGENTES- ELECTRA	2010-2012	CEMOP/UNINOVA; FCT/UNL	PTDC/CTM/099124/2008	90 810
	"TRANSPARENT THIN FILM TRANSISTORS BASED ON ZNO FOR FLEXIBLE DISPLAY APPLICATIONS".	2006-2008	CENIMAT (COORDINATOR), CEMOP	POCTI/CTM/55942/2004	79 500
	INTEGRATED MEMORY MADE OF PAPER USING THIN FILM TRANSISTORS WITH	2010-2012	CEMOP/UNINOVA , FCT/UNL	PTDC/CTM/103465/2008	97 164

	channel of oxides - IMPACT				
	Potable platform of nanobiosensors for sensible for multi sample blood analysis - BloodFET	2010-2012	CEMOP/UNINOVA , FCT/UNL	PTDC/SAU-BEB/098125/2008	98 356
	Nanobiodetection based in systems formed by optical nano-sensors formed by gold nanoparticles: NANOBIOS	2008-2010	CEMOP/UNINOVA , FCT/UNL	PTDC/FIS/74274/2006	95 850
	New advanced integrated systems of optical nano-sensors for Nanobiodetection-NANOSEN	2008-2010	CEMOP/UNINOVA , FCT/UNL	PTDC/EEA-ELC/74236/2006	45 340
	"Self-sustained intelligent windows based on photo-electrochromic devices"	2005-2007	CENIMAT (coordinator), CEMOP, U.M. (Dept Física).	PTDC/CTM/099124/2008	45 000
	"Development of transparent p-type oxide semiconductors: from processing to device applications".	2005-2007	CENIMAT (coordinator), CEMOP, U. Aveiro, ITN. Cenimat	POCTI/CTM/55945/2004	32 000
	"Transparent Conductive Oxides for Optoelectronic and Gas sensor applications"	2002-2006	CENIMAT (coordinator) e CEMOP	POCTI/CTM/38924/2001	63 500
	"3D Position Sensitive Sensors-POSINSPEC"	2001-2005	Tekelec (coordinator), CENIMAT and UNINOVA/CEMOP.	POCTI/6207	165 000
	"A new flexible position angular sensor to be integrated in micromechanical devices"	2001-2005	CENIMAT (coordinator) and CEMOP.	POCTI/1999/ESE/35578	85 000
	"New amorphous silicon based materials used in novel flexible position sensors"	2000-2005	CENIMAT (coordinator) and CEMOP.	POCTI/1999/CTM/35440.	69 000
	"Intelligent Colour Sensors"	2002-2003	CENIMAT and UNINOVA/CEMOP (coordinator).	POCTI/CTM/37344/2001	115 000
	"New Technologies for the production of solar cells- UNISOL"	1999-2002	CENIMAT e UNINOVA/CEMOP (coordinator).	PRAXIS/C/CTM/12094/1998,	47 500
European	"Autonomous Printed Paper products for functional Labels and Electronics, APPLE"	2010-2013	Uninova/CEMOP/CENIMAT, PT; VTT (FI); Varta (DE); Commissariat à l'Energie Atomique, F; Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, NL; Polypore, F; ViTechnology (Bl); RG Plastiques, F; Felix-Schoeller (DE); JoutsenPaino (FI); Reynders Etiketten Polska (Pl	FP7-NMP-2010-SME-4, Proposal No:262782-2	344148
	Printable Organic-Inorganic Transparent Semiconductor Devices, POINTS"	2010-2013	Fraunhofer Gesellschaft zur Foerderung der angewandten Forschung, D; CENIMAT/FCTUNL, PT; University of Cambridge UCAM, UK; Multivalent Multivalent, UK; Promethean Particles Promethean, UK; Stora Enso Oyj Stora Enso, FI; 8 Bayer Technology Services, GmbH BTS DE; University Dunarea de Jos of Galati UDJG, RO	FP7-NMP-2010-SMALL-4	562 200
	"Smart electrochromic active matrix components for stand-alone multifunctional devices, SMART-EC"..		Politecnico di Torino, IT; ACREO AB, SE; Rockwood Pigments Ltd, UK; Bundesdruckerei GmbH, DE; Commissariat à l'Energie Atomique etaux Energies Alternatives, for its LITEN laboratory, F; PLASTIQUES RG, F; Fraunhofer	FP7-ICT-2009.3.9: Microsystems and smart miniaturized systems, grant nº 258203	832 500

			GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V., DE;SOLEMS SA, F; VITECHNOLOGY, F; G24 INNOVATIONS LTD; UK; BIOAGE S.R.L., IT		
	"OXIDE MATERIALS TOWARDS A MATURED POST-SILICON ELECTRONICS ERA, ORAMA",		FOUNDATION FOR RESEARCH AND TECHOLOGY HELLAS, GR; INSTITUT JOŽEF STEFAN, SL: PHILIPS ELECTRONICS UK LTD; PHILIPS ELECTRONICS NEDERLAND B.V.NK, NL; OSRAM OPTO SEMICONDUCTORS GMBH, DE; CONSIGLIO NAZIONALE DELLE RICERCHE, IT; JUSTUS-LIEBIG-UNIVERSITAET GIESSEN, DE; UNIVERSITY COLLEGE LONDON, UK; UNIVERSITY OF CAMBRIDGE, UK; EBERHARD KARLS UNIVERSITAET TUEBINGEN, DE; STEINBEIS GMBH & CO. KG FUER TECHNOLOGIETRANSFER, DE; NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK – TNO, NL; CENTRO RICERCHE FIAT SCPA, IT	FP7-NMP-2009-LARGE-3, CP-IP 246334-2 7 2010	1 115 000
	"MULTICOMPONENT OXIDES FOR FLEXIBLE AND TRANSPARENT ELECTRONICS-MULTIFLEXIOXIDES"	2006-2009	UNINOVA (PT), (COORDINATOR); TYNDALL (IR); CENIMAT (PT); U. BARCELONA (ES); HP (IR); FIAT (IT); J. STEFAN INSTITUTE (SI).	FP6-2004-TI-4" – PROPOSAL N° 032231 (2006/2009)	500 000
	"DEVELOPMENT OF NEW PRODUCTION TECHNIQUES FOR HIGHLY EFFICIENT POLYMORPHOUS SOLAR CELLS- H-ALPHA SOLAR"	2000-2004	U. EINDHOVEN/TUE, COORDENADOR (NL); U. ORLEANS/GREMI (FR); CNRS/PICM (FR); UNINOVA/CEMOP (PT); ATECNIC/PORTSOL (PT); BALZERS A. G./BPS (LI); AKZO NOBEL CHEMICAL B.V./ANC (NL).	BRITE-EURAM, NNE5-1999-00133.	265 000
	"INSPECTION OF LARGE SOLDERED JOINTS AND OPTIMISATION OF SOLDERING PROCESS - LASOL"	1998-2003	AEG, COORDENADOR (DE); JENOPTKIS (DE); FERBV (DE), FRAUNHOFFER INST. (DE); NMRC (IRL); TEKELEC (PT); UNINOVA/CEMOP (PT).	BRITE-EURAM, BRE-CT97-4689	247 500
	"EUROPEAN NETWORK ON AMORPHOUS-SILICON DEVICE TECHNOLOGY-ASINET".	2000-2005	CIEMAT (ES), COORDENADOR; ENEA (IT); U. CRANFIELD (UK); PILKINGTON (UK); U. BARCELONA (ES); CNRS/PICM (FR); AKZO NOBEL B.V./ANC (NL); CNR (IT); U. STUTTGART (DE); IST (PT); LAMEL (IT); U. TORINO (IT); U. PATRAS (GR); U. DELFT/TUE (NL); UNINOVA/CEMOP (PT); U. CAMBRIDGE (UK); U. UTRECHT (NL); U. ROMA (IT); TNO (NL).	BRITE-EURAM, GTC1-2000-28040.	245 000
				TOTAL	**4111348**

LIST OF PROJECTS

NATIONAL PROJECTS

INDUSTRIAL PROJECTS

1. **NANOXIDES-"New Nanoxides Composites to produce targets for passive and actives applications in Opto-Micro-Nano-electronics**"; **Objectives**: This project aims to develop new multicomposite oxides, environmental and human- been friendly for production ceramic targets based on ZnO and its doped and undoped composites, ex.ZnO/Al2O3 as well as other functional oxides such as TiO2, Al2O3 and Fe2O3, for active and passive thin films applications on Optoelectronic and Micro/Nano-electronic devices; **Financed by**: QREN Nº 3454; **Duration**: 2009-2011; **Partners**: INNOVNANO, CENIMAT; **Budget**: **393 328€** ; **SR**: Elvira Fortunato and **Isabel Ferreira (coordination)**

2. **NanoSi-PVCells -"Development of photovoltaic devices based on nanostructured silicon"**; **Objectives**: To develop photovoltaic solar modules and production processes for: - Large area / low cost innovative nanostructured Si pin devices increasing efficiencies from 7 to above 10%; - Hybrid junctions to take efficiencies further and gain other product characteristics like transparency; -Flexible PV: **Financed by**: QREN Nº 5610; **Duration**: 2009-2011; **Partners**: SOLARPLUS, CENIMAT; **Budget**: 219 385€ ; **SR**: Rodrigo Martins and **Isabel Ferreira (coordination)**

3. **SolarTiles - Development of PV systems in ceramics"; Objectives:** The main objective is to develop at a laboratorial scale integrated functional prototypes of high efficiency for building applications, by depositing photovoltaic thin films. **Financed by**: QREN Nº 3380; **Duration**: 2009-2011; **Partners**: • Dominó-Indústrias Cerâmicas SA; J. Coelho da Silva, SA; ADENE - Agência para a Energia; CTCV - Centro Tecnológico da Cerâmica e do Vidro; INETI - Instituto Nacional de Engenharia, Tecnologia e Inovação; FCT-UNL-CENIMAT; Universidade do Minho; De Viris,Natura e Ambiente S.A; **Budget**: 190 452€ ; **SR**: Rodrigo Martins and **Isabel Ferreira (coordination)**

4. **"YInvisible – Paper"; Objective**: The aim of this project is to apply the methodology of reality computer to the cellulose based paper by using electrochromic and other materials used in transparent electronics aiming to functionalize it by giving to it electronic functions such as to implant in it transparent electrodes and so making its use suitable as substrates or supplying to it intelligent functions; **Financed by**: AdI/Ideia/2006; **Duration:** 2006 to 2008;**Partners:** YDreams; FCT – Departamento de Química; FCT – Departamento de Materiais Renova – Fábrica do papel do Almonda, S.A. Total.; **Budget: 121,883.35 €; SR:** E. Fortunato and R. Martins

5. **"YInvisible – Boards"; Objective**: The aim of this project is to develop interactive boards using invisible inks based on electrochromic and thermochromic materials, well supported by adequate transparent electronic components to make them suitable to behave as intelligent passive displays that may wireless interact or to be controlled; **Financed by:** AdI/Ideia/2006; **Duration:** 2006 to 2008; **Partners:** YDreams; FCT – Departamento de Química; FCT – Departamento de Materiais; Bi-Silque, Artigos para Casa e Escritório, S.A.; **Budget: 126,109.60; SR:** E. Fortunato and R. Martins

6. **"YInvisible – YTshirt-Têxtil"; Objective:** The aim of this project is to generate competences in the creation of intelligent cloths by using intelligent chemical materials such as electrochromics deposited on their surfaces. This may be the start up of novel flexible analogic displays able to be printed in a T-shirt. These new displays aims to wireless inter-act with the user or an external control unit, for instance to prevent robberies or to certify their authenticity; **Financed by:** AdI/Ideia/2006; **Duration:** 2006 to 2008; **Partners:** YDreams; FCT – Departamento de Química; FCT – Departamento de Materiais; Fábricas de Malhas Filobranca, S.A.; **Budget: 85,837.65€; SR:** E. Fortunato and R. Martins

7. **"Development of Infra-Red detectors based on crystalline silicon technology- IRS"; Objectives**: To develop the process aiming to produce Infra-red detectors based on the crystalline silicon technology able to be used in optical sensor applications, such as control units or target aiming applications where the devices is simple to the shot of a laser pulse; **Financed by:** POE, B3, medida 3.1 (2002/2005), ref. 03/00198; **Duration:** 2003 to 2007; **Partners:** UNINOVA/CEMOP (**coordinator**) + CENIMAT+CSP; **Budget: 471209.13 €; SR: E. Fortunato (coordinator) and R. Martins**

8. **"1024 array of linear position sensors for optical camera inspections -SENSIT", Objectives**: The aim of this project is to develop 256 line integrated position sensor and the corresponding peripheral electronics that make this sensor suitable to be integrated in inspection camera systems. The project innovation and high risk lies in the production of the integrated array of linear position sensors based on the amorphous silicon technology, making the inspection camera able to supply a continues information on real time, differently from what happens with CCD based inspection cameras. The data up to know achieved make this sensor and the integrated board to which the sensor is connected, unique worldwide!; **Financed by:** POE, acção B3, medida 3.1 (2004/2007), ref. 03/00197; **Duration:** 2003 to 2007; **Partners**: UNINOVA/CEMOP (coordinador), CENIMAT and Tekelec; **Budget**: 525000€; **SR:** R. Martins (coordinator) and E. Fortunato.

9. **"3D Position Sensitive Sensors- POSINSPEC"; Objectives**: To develop and to integrate in a control demonstrator unit based on CCD devices a 32 to 64 integrated position sensitive detector array to detect malfunction on soldering components and to determine spatial profiles on components, in real time. **Financed by**: POCTI/6207 Invest. em consórcio 2002/2006; **Duration:** Out. 2001 a Dez. 2005; **Partners:** Tekelec (coordinador), CENIMAT and UNINOVA/CEMOP; **Budget**: 165000 €; **SR: R.** Martins (coordinator) and E. Fortunato.

10. **"Solid State Time Meter – METES"; Objectives:** This project aims to develop a solid state timer able to monitor the life time of a device or equipment with which it is connected. The device to be developed will substitute a product only fabricate worldwide by Tekelec, designated by INDACHRON that is in the end of its life, essentially due to environment restrictions since INDACHRON is a device mercury based and since it is highly sensitive to vibrations and thermal variations. The device to be developed is based in the detection and accumulation charge principle on structures with electrochromic materials (colour changes) and how this is related with the time, able to satisfy the following requirements: ecological compatible and measurements vibration's and temperature independent (solid state); to allow the visualization of the lifetime of the device with and without energy applied; to be mechanical and electrical compatible with the actual product; able to restore the initial state; precision better than 5% over the full scale of the device; to have costs below 2 Euros; **Financed by:** POSI/6250- 2002/2005.

Duration: January 2002 to December 2005; **Partners:** Tekelec (co-coordinator), CENIMAT and UNINOVA/CEMOP.

Budget: 195600 €; **SR:** E. Fortunato (coordinator) and R. Martins.

BASIC RESEARCH

- ***"MONALISA"- ÓXIDOS MULTIFUNCIONAIS: NOVA APROXIMAÇÃO À INTEGRAÇÃO A BAIXA TEMPERATURA DE ÓXIDOS SEMICONDUTORES COMO FILMES FINOS ACTIVOS E PASSIVOS NA NOVA GERAÇÃO DE SISTEMAS ELECTRÓNICOS;***
  Objectives: The aim of this project is to develop new multifunctional semiconduting oxide based materials produced at low temperatures acting as active or passive layers for optoelectronic thin film devices application; **Financed by:** PTDC/CTM/73943/2006; **Duration:** Jan 2007 a Dez. 20010; **Partners:** CEMOP/UNINOVA; CENIMAT and CEOT (U. Algarve); **Budget: 150,000.0 €; SR: Isabel Ferreira (coordinator)** and Elvira Fortunato

- **"Integrated Memory made of paper using thin film transistors with channel of oxides - IMPACT";** Objectives: Development of paper transistors and memories into the same substrate to produce paper logic electronic devices; **Financed by**: PTDC/CTM/103465/2008; Duration: 2010-2012; **Partners**: CEMOP/UNINOVA,FCT/UNL; **Budget**: 97 164€; SR: Rodrigo Martins and Elvira Fortunato

- **Portable platform of nanobiosensors for sensible for multi sample blood analysis - BloodFET**; Objectives: Development of thin film transistors based in oxide semiconductors to detect changes in blood samples; **Financed by**: PTDC/SAU-BEB/098125/2008; Duration: 2010-2012; **Partners**: CEMOP/UNINOVA,FCT/UNL; **Budget**: **98 356€;** SR : Elvira Fortunato and Rodrigo Martins

- **New advanced integrated systems of optical nano-sensors for Nanobiodetection-NANOSEN**; Objectives: Integration optical sensors based in amorphous silicon with micro fluidic for biosensor applications; **Financed by**: PTDC/EEA-ELC/74236/2006; Duration: 2010-2012; **Partners**: CEMOP/UNINOVA,FCT/UNL; **Budget**: **45 340€;** SR: Elvira Fortunato and Rodrigo Martins

- **Nanobiodetection based in systems formed by optical nano-sensors formed by gold nanoparticles**: NANOBIOS; Objectives: Development of optical sensors able to detect changes in DNA marked with gold nanoparticles; **Financed by**: PTDC/FIS/74274/2006; Duration: 2008-2010; **Partners**: CEMOP/UNINOVA, FCT/UNL; **Budget**: 95 850**; SR**: Elvira Fortunato and Rodrigo Martins

- **"Transparent Thin Film Transistors based on ZnO for flexible display applications"; Objectives**: The project aims the study, production and development of highly stable transparent thin film transistors TTFT fully based in ZnO films with different properties and/or including structures with high k-dielectrics, To reach this goal, several device configurations will be tested (top and bottom gate) as well as the use of different dielectrics (combinations of single or stacked HfO; TiO_2; Al_2O_3 layers), where special attention is given to interface engineering; **Financed by:** Project POCTI/CTM/55942/2004;**Duration:** January 2006 to December 2008; **Partners**: CENIMAT (**coordenador**), CEMOP. **Budget: 79500 €; SR:** R. Martins (coordinator) and E. Fortunato

- **"Development of transparent p-type oxide semiconductors: from processing to device applications".**

  Objectives: The project aims the study, production and development of low cost conductive and transparent p-type ZnO thin films deposited by rf magnetron sputtering and its application to near UV optoelectronic devices. In order to achieve such goal the project has three main tasks: 1- Development of high quality ZnO thin films by rf magnetron sputtering; 2- Control and comparison of the p-type doping in two different ways: in situ - incorporation of the dopant during the growth (using nitrogen gas sources) and ex situ – nitrogen ion implantation; 3- Production and characterization of transparent UV detector and UV emitting diodes

  To reach these goals the proposed work plan has the following technical tasks: 1. Production, development and characterization of high quality undoped ZnO films; 2. Doping and structural characterization; 3. Electrical, optical and magnetic resonance characterization; 4. Production and characterization of pn junctions; 5. Management; **Financed by**: POCTI/CTM/55945/2004; **Duration:** January 2005 to December 2007; **Partners**: CENIMAT (**coordinator**), CEMOP, U. Aveiro, ITN. Cenimat; **Budget: 32000 €; SR:** E. Fortunato (coordinator).

- **"Self-sustained intelligent windows based on photo-electrochromic devices"; Objectives**: The main objective of this project is to develop an intelligent and self powered window to control de transmittance in intelligent buildings. The window will be based on electrochromic materials while the optical sensor will be based on a transparent amorphous silicon solar cell; **Financed by:** POCTI/CTM/48853/2002 (2004/2007); **Duration:** January 2005 to December 2007; **Parctners**: CENIMAT (**coordinator**), CEMOP, U.M. (Dept Física); **Budget: 45000 €; SR**: E. Fortunato (coordinator), R. Martins.

- **"Intelligent Colour Sensors**"; **Objectives:** The objective of this project is to develop a smart colour sensor with one or two terminal where the colour sensor and its discrimination fully depend on the type of bias and its magnitude used. The type of structures proposed to be developed are [TCO/MISsic/TCO/MISgraded/MISsi/TCO] and TCO/MISsic/ pinip/TCO, based on polymorphous/microcrystalline silicon and their alloys, produced by PECVD technique using a 27.2 MHz rf power; **Financed by:** POCTI/CTM/37344/2001; **Duration:** Sept. 2002 to Sept 2002; **Partners:** CENIMAT and UNINOVA/CEMOP (**coordinator**); **Budget: 115000 €; SR:** R. Martins (coordinator) and **I. Ferreira.**

- **"Transparent Conductive Oxides for Optoelectronic and Gas sensor applications"; Objectives:** The scope of this proposal is to produce transparent conductive oxide (TCO) layers for optoelectronic and gas sensor applications, reliable of low cost, able to match to different substrate shapes and geometries, mechanical resistant, deposited on polymeric substrates. That is, the deposition process has to be taken place at temperatures below 100ºC, not compatible with the existing process methods that require substrate temperatures above 200ºC.

  For optoelectronic applications, namely solar cells and optical sensors, the aim is to produce TCO with transmittances >80% and sheet resistances < 20ohms/sqr., deposited on mylar. For gas sensor applications, the TCO should be highly resistive, in order to have sensitivity (SE)

and selectivity (SL) to CH_4, the main component of the natural gas; **Financed by:** POCTI/CTM/38924/2001; **Duration:** Jan 2002 a Mar. 2006; **Parctners:** CENIMAT (**coordenador**) e CEMOP; **Budget: 63500€; SR:** E. Fortunato (coordinator) and R. Martins

- **"A new flexible position angular sensor to be integrated in micromechanical devices"; Objectives:** The aim of this project is to integrate flexible large area position sensitive detector (PSD) based on amorphous silicon (a-Si:H) on micromechanical machines in order to control the angular position and velocity of a micromotor with a spatial precision better than one micrometer; **Financed by:** POCTI/1999/ESE/35578; **Duration:** January 2001 to December 2005; **Parctners:** CENIMAT (**coordenador**) and CEMOP; **Budget: 85000€; SR:** E. Fortunato (coordinator) and R. Martins

- **"New amorphous silicon based materials used in novel flexible position sensors"; Objectives**: This project aims to develop a new flexible large area (□10mm×40mm) position sensitive detector (PSD) based on amorphous silicon (a-Si:H) thin film technology. The sensor will be deposited onto an ultra thin polymer (polyimide foil) with thickness varying from 0.025 to 0.125□m. The sensor structure (type pin and nip) will be deposited by rf plasma enhanced chemical vapour deposition (PECVD) and hot-wire techniques. The bottom electrode will be resistive tin oxide (SnO_2) deposited by spray pyrolysis or magnetron sputtering and the top metal contact by thermal/electron gun evaporation. The sensor radius of curvature will be □14 mm and able to perform a continuous control of a rotor with response times better than 100□s and linearity better than 99%;**Financed by:** FCT, POCTI/1999/CTM/35440; **Duration:** Set. 2000 a Set. 2005; **Partners:** CENIMAT (**coordenador**) and CEMOP; **Budget: 69000€; SR:** E. Fortunato (coordinator) and R. Martins

- **"New Technologies for the production of solar cells- UNISOL"; Objective**: The main objective of this project is to develop new thin silicon films for PV and other optoelectronic applications, aiming to reach a breakthrough on the actual state of art. This implies to prosecute two main routes: one to improve the actual state of practice and the other to innovate the basics of the actual thin film technology, through: (1) Nanostructured thin films; (2) to develop new nano/polycrystalline thin Si films through hot wire plasma assisted technique; (3) to produce pin ands SIS devices based on the novel materials; **Financed by**: PRAXIS/C/CTM/12094/1998, 1999/2004; **Duration:** Sept. 1999 to October 2002 and from October 2002 to Sept. 2004; P**artners**: CENIMAT e UNINOVA/CEMOP (coordenador); **Budget: 47500 €; SR:** R. Martins (coordinator) and **I. Ferreira**

INDUSTRIAL PROJECTS

1. "**Autonomous Printed Paper products for functional Labels and Electronics, APPLE**" FP7-NMP-2010-SME-4, Proposal No:262782-2 APPLE CP-TP. Coordinator: Centre Technique du Papier (F). Scientific coordinator: R. Martins and E. Fortunato. Co-coordinator: L. Pereira. Researchers: I. Ferreira, P. Barquinha. Partners: Uninova/CEMOP/CENIMAT, PT; VTT (FI); Varta (DE); Commissariat à l'Energie Atomique, F; Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, NL; Polypore, F; ViTechnology (Bl); RG Plastiques, F; Felix-Schoeller (DE); JoutsenPaino (FI); Reynders Etiketten Polska (Pl). Budget to Campus FCT: 344,148.00€

2. "**Printable Organic-Inorganic Transparent Semiconductor Devices, POINTS**", FP7-NMP-2010-SMALL-4. Coordinator: VTT (FI). Co-coordinator: E. Fortunato. Researchers: L. Pereira, R. Martins, P. Barquinha, I. Ferreira. Partners: Fraunhofer Gesellschaft zur Foerderung der angewandten Forschung, D; CENIMAT/FCTUNL, PT; University of Cambridge UCAM, UK; Multivalent Multivalent, UK; Promethean Particles Promethean, UK; Stora Enso Oyj Stora Enso, FI; 8 Bayer Technology Services, GmbH BTS DE; University Dunarea de Jos of Galati UDJG, RO. Budget to Campus FCT: 562,200.00€.

3. "**Smart electrochromic active matrix components for stand-alone multifunctional devices, SMART-EC**". FP7-ICT-2009.3.9: Microsystems and smart miniaturized systems, grant nº 258203 Coordinator: CRF (IT); Research Responsible (CEMOP/CENIMAT, PT). Co-coordinator: R. Martins. Scientific coordinator: E. Fortunato. Responsible: L. Pereira. Researchers: I. Ferreira, H. Águas. Partners: Politecnico di Torino, IT; ACREO AB, SE; Rockwood Pigments Ltd, UK; Bundesdruckerei GmbH, DE; Commissariat à l'Energie Atomique et aux Energies Alternatives, for its LITEN laboratory, F; PLASTIQUES RG, F; Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V., DE;SOLEMS SA, F; ViTechnology, F; G24 Innovations Ltd; UK; Bioage S.r.l., IT. Budget Campus FCT: 832,500.00 €.

4. "**Oxide Materials Towards a Matured Post-silicon Electronics Era, Orama**", FP7-NMP-2009-Large-3, CP-IP 246334-2 7 2010. Coordinator (Fruanhofer-D). Co-coordinator and scientific responsible: R. Martins. Responsibles: E. Fortunato and L. Pereira. Researchers: P. Barquinha, I. Ferreira. Partners: Foundation for Research and Techology Hellas, Gr; Institut Jožef Stefan, SL: Philips Electronics UK LTD; Philips Electronics Nederland B.V.NK, NL; OSRAM Opto Semiconductors GmbH, DE; Consiglio Nazionale delle Ricerche, IT; Justus-Liebig-Universitaet Giessen, DE; University College London, UK; University of Cambridge, UK; Eberhard Karls Universitaet Tuebingen, DE; Steinbeis GmbH & Co. KG fuer Technologietransfer, DE; Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek – TNO, NL; Centro Ricerche Fiat SCPA, IT; Bekaert Advanced Coatings NV, B. Budget Campus FCT:1,115,000.00 €.

5. **"Multicomponent Oxides for Flexible and Transparent Electronics-MULTIFLEXIOXIDES"; Objectives:** The overall project goal of MULTIFLEXIOXIDES is to develop tailored oxide thin films with radical electronic properties and the development of new non-fab processes for the fabrication of display backplanes on flexible substrate materials. This project will provide proof-of-concept and preliminary industrial validation of new routes to form flexible transparent displays at room temperature; **Financed by:** FP6-2004-TI-4" – Proposal n° 032231 (2006/2009); **Duration:** Sept 2006 a Dec 2009; **Partners:** Uninova (PT), (**coordinator)**; Tyndall (IR); CENIMAT (PT); U. Barcelona (ES); HP (IR); FIAT (IT); J. Stefan Institute (SI). **Duration**: Starting data September 1st, 2006 to end in December 2009; **Budget: 500000€; SR:** R. Martins (coordinator) and E. Fortunato

6. **"Advanced Handling and Assembly in Microtechnology- ASSEMIC"; Objectives:** The project has as objectives to hire formation and to develop new tools and systems for ultra-precision positioning accuracy (micro and nano range) with improved performance; to develop innovative tools for micro handling and assembly; to develop advanced control processes and strategies for micro-handling and –assembly; to develop a methodology for micro-handling and assembly in special applications and to address also industrial production issues and manufacturability of assembled MEMS; **Financed by:** 6th UE programme, Marie Curie Actions: Research Training Networks, proposal nº 504826; **Duration:** Jan. 2003

a Dec. 2007; **Partners:** U. Viena (AT) coordenador; FSRM (CH); ARC (DE); IMT (RO); WUT (PL); UNINOVA (PT); AmiR (DE); Robotiker (SE); FORTH-HELLAS (GR); Medplant Genetics + Proteomica (SE); RAL-CCLRC (UK); Fraunhofer Institut für Lasertechnik – ILT (DE); SSSA (IT); Nascatec (DE); **Budget: 285000 €; SR: I. Ferreira** and R. Martins

7. **"European Network on Amorphous-Silicon Device Technology-ASINET"; Objectives:** The present proposal is aimed at the creation of a European Network on Amorphous-Silicon Device Technology. The initiative has been inspired on the appreciation that although ... The network will have a positive impact on the European economic development, derived from the opportunity to put and keep in contact industrial groups having complementary points of view and RTD centres, all of them having in common their interest on a technology whose potential are enormous. Such an interaction will result in new RTD projects, new products and the technological progress of the European industry; **Financed by:** Brite-EuRam, GTC1-2000-28040; **Duration:** Jan. 2000 a Dec. 2005; **Partners:** CIEMAT (ES), coordenador; ENEA (IT); U. Cranfield (UK); Pilkington (UK); U. Barcelona (ES); CNRS/PICM (FR); Akzo Nobel b.v./ANC (NL); CNR (IT); U. Stuttgart (DE); IST (PT); LAMEL (IT); U. Torino (IT); U. Patras (GR); U. Delft/TUE (NL); UNINOVA/CEMOP (PT); U. Cambridge (UK); U. Utrecht (NL); U. Roma (IT); TNO (NL); **Budget: 245000 €; SR:** R. Martins and E. Fortunato**.**

8. **"Development of new production techniques for highly efficient polymorphous solar cells- H-Alpha Solar"; Objectives:** The general aim of the project consists in the development of industrially applicable production techniques for solar cells using polymorphous silicon with stable efficiencies above 10%, exploring in-line batch as well as continuous roll-to-roll techniques, aiming to ultimately obtain a system cost of 1 Euro/Watt-peak (1Euro/Wp). The module manufacturing cost reduction aimed at will be reached by simultaneously increasing the photovoltaic efficiency, improving the production yield, increasing the feedstock utilisation efficiency, and decreasing the cost of ownership by enhancing the growth rate; **Financed by:** Brite-EuRam, NNE5-1999-00133.

   Duração: April 2000 a July 2004; **Partners:** U. Eindhoven/TUE, coordenador (NL); U. Orleans/GREMI (FR); CNRS/PICM (FR); UNINOVA/CEMOP (PT); ATECNIC/PORTSOL (PT); Balzers A. G./BPS (LI); Akzo Nobel Chemical b.v./ANC (NL); **Budget: 265000 €; SR:** R. Martins and E. Fortunato.

5. **"Inspection of large soldered joints and optimisation of soldering process - LASOL"; Objectives**: The main objective of this project is to develop tools able to monitor the performances and the geometry of large soldered joins. This will be performed by proper development of a system that includes optical sensors and the required software's for: gathering, reducing and filtering noisy measurement information; for reconstruction of geometric features from measurements; for detection and classification of abberating and faulty LSJ's; **Financed by:** Brite-EuRam, BRE-CT97-4689; **Duration:** Nov. 1998 a April 2003; **Partnerss:** AEG, coordenador (DE); JENOPTKIS (DE); FERBV (DE), Fraunhoffer Inst. (DE); NMRC (IRL); TEKELEC (PT); UNINOVA/CEMOP (PT).

   Budget: 247500 €; **SR**: R. Martins and E. Fortunato.

BASIC RESEARCH

1. **"Materials Engineering and Physics of Quasimorphous Silicon Thin Films for its Application in Large Area Electronics"; Objectives:** This project aims to facilitate international cooperation between three laboratories involved in research on a form of thin-film silicon, which we term "quasimorphous." A material as having electronic properties significantly improved and defect metastability (the generation of dangling bond defects by light or other non-equilibrium excitation) reduced compared to those for hydrogenated amorphous silicon prepared under conventional deposition conditions, called ?–regime. We seek to understand how drift mobilities and other electronic properties that are sensitive to disorder-induced localization vary and we shall also explore why defect metastability varies between quasimorphous and conventional amorphous silicon; **Financed byo:** FLAD (projecto 85/02); **Duration:** Set,. 2002 a Dec 2005; **Partners:** CEMOP/ UNINOVA (**coordinator**), CENIMAT (Portugal), Physics Dept of Syracuse University, USA; **Budget: 165 000 €; SR:** R. Martins (coordinator) and **I. Ferreira.**

3. SCIENTIFIC RECOGNITION

3.1. ORGANIZATION OF CONFERENCES

1. "21st International Conference on Amorphous and Nanocrystalline Semiconductors-ICANS 21", Lisboa, Fundação Calouste Gulbenkian, Portugal, September 4-8, 2005. - **Chairs**: R. MARTINS (FCT-UNL, Portugal), E. FORTUNATO (FCT-UNL, Portugal), I. FERREIRA (FCT-UNL, Portugal), V. Chu (INESC, Portugal), J.P. Conde (IST, Portugal).
2. 11th Portuguese Materials Research Society Conference, 2nd International Materials Symposium, Lisbon, Portugal, Campos de Caparica, April 14-16, 2003. - **Chairs**: R. Martins, E. Fortunato, I. Ferreira, C. Dias (FCT-UNL, Portugal).

3. "IV Workshop on Dusty and Colloidal Plasmas", **Chairs**: R. Martins, I. Ferreira, E. Fortunato and G. Kroesen, Costa da Caparica, Portugal, June 3-5, 2000.

3.2. PARTICIPATION IN JURIES

PhD Juries

1. Gonçalo Gonçalves, Desenvolvimento de Novos TCOs para Aplicações em OLEDs, PhD Thesis in Nanosciences and Nanotechnologies at Universidade Nova de Lisboa, 2011. (Member)
2. MIGUEL FERNANDES,"Sensores de Imagem de grande área em tecnologia de silício amorfo", PhD Thesis in Materials Engineering at Universidade Nova de Lisboa, 2008. (Member)
3. LUÍS PEREIRA, "Produção e caracterização de silício policristalisno e sua aplicação em TFTs", PhD Thesis in Materials Engineering at Universidade Nova de Lisboa, 2008. (Member)
4. LEANDRO RANIERO, "Produção e caracterização de células fotovoltaicas de silício polimorfo produzidas por plasma de 27 MHz", PhD Thesis in Materials Engineering at Universidade Nova de Lisboa, 2006. (Member)
5. HUGO ÁGUAS, Dispositivos de Estrutura: Metal-Isolante-Semicondutor: Aplicação a Sensores de Posição. PhD Thesis in Materials Engineering at Universidade Nova de Lisboa, 2005. (Member)

MSC Juries

As arguent

1. João Luís Camacho Baptista Figueira, Ruthenium and Palladium based organometallic materials for nanoelectronic applications, FCT-UNL, 2011.
2. Joel Ribeiro Casalinho, Rendimento de painéis solar térmicos poliméricos unglazed e glazed, Universiade de Aveiro, 2009.
3. Ricardo Pinho Silva, Células Solares Orgânicas baseadas em MEH-PPV, Universidade de Aveiro 2009

As member

4. Ana Margarida Luz, Análise de Limpeza Manual das Lentes Desblocadas por Impacto e Fusão da Liga Metálica, FCT-UNL 2009.
5. MARIA CONCEIÇÃO, MSc Thesis in Management and Quality of Materials at Universidade Nova de Lisboa, 2003.

As supervisor

6. Adriana Nogueira, Production and characterization of thermoelectrics/thermochromics materials.
7. Joana Pereira, Characterization of TiO2 nanopowders envisaging toxicology studies.
8. Joana Neto, Production of bio-batteries for medical applications.
9. Tiago Mateus, Optimization of Si-a solar panels, Solar Plus, Portugal
10. Mario Guimarães, Monitorization of PV systems based on amorphous silicon technology Solar Plus, Portugal

11. Diana Gaspar, Development of solar cells based on nanostrucured Si for application in solar tiles
12. Bruno Brás, Thin Film paper batteries and applications to thin film transistors, Has got the 3th place in the contest of "Best probation in Materials Engineering at National level"
13. Ana Baptista, Production of Bio-batteries using membranes obtained by electrospinning,
14. Helena Orvalho, Determination of hydrogen permeation through parabolic trough absorbers and the influence of barrier coatings
15. Sofia Carvalho Garvão, "Development of a new selective absorber coating system for parabolic trough receiver via magnetron sputter",
16. José Carlos Valadas, Production and characterization of electrochromic windows.
17. Lúcia Gomes, Production and characterization of semi-transparent solar cells-
18. Tânia Silva, Photovoltaic systems: analysis of acquired data and of working problems
19. Carla Sofia Carrelo Marinho, Selective absorbing surfaces with organic pigments
20. Tânia Sofia Rodrigues Cardoso, Recycling wind generators and parks: recovering and reprocessing materials at end life cycle of systems
21. Raquel Nogueira, Anemometric of metallic mast: degradation of materials by corrosion,
22. Sílvia Malcato, Project and selection of materials to a low cost rotor for wind generator,
23. Pedro Percheiro, Behaviour of powders with high CV in mass production

3.3. PEER REVIEWING IN SCIENTIFIC JOURNALS

Plasma Sources Sci. Technol.
Sensors
Europhysics Letters
Biosensors and Bioelectronics
Materials Chemistry and Physics
Sensors & Actuators A e B
Thin Solid Films
Vacuum
Journal of Non-Crystalline Solids
Materials Science and Engineering

3.4. PEER REVIEWING OF PROJECTS

Member of evaluation panel of "ERC Starting Grants" – European Research Council (since 2007).

Reviewer of the FP7 Energy projects (2011)

Swedish Foundation for Strategic Research

3.5. PRIZES

Honour Mention in the *Green Awards 2011*, with the paper battery concept.

Best poster award 2011 from E-MRS Fall Meeting for the work "Aluminum-doped zinc oxide – AZO sputtering targets obtained from nanopowders: processing and application" by N. Neves, R. Barros, E. Antunes, I. Ferreira, E. Fortunato and R. Martins

Best poster award 2011 from E-MRS Fall Meeting for the work "A study of various deposition parameters for achieving a better control over fabrication of single and

multilayer protocrystalline Si absorber film" by A. Vicente, S. K. Ram, B. Diaconu, D. Gaspar, S. A. Filonovich, A. Araújo, H. Águas, I. Fereira, E. Fortunato, R. Martins.

JID best paper award 2010 from Korean Information Display Society to the work "Self-sustained n-Type Memory Transistor Devices Based on Natural Cellulose Paper Fibers" by R. Martins, L. Pereira, P. Barquinha, N. Correia, G. Gonçalves, I. Ferreira, C. Dias, N. Correia, M. Dionísio, M. Silva and E. Fortunato.

Honour mention-3th classification in the contest of Jornadas do Mar -Escola Naval, 2008

(Honour mention)-2nd classification in the contest of Jornadas do Mar -Escola Naval, 2008)

Best poster award for the work: "Effect of the deposition pressure on the morphological properties presented by ZnO:Ga thin films deposited by rf magnetron sputtering" - PVSEC-14 Thailand, by E. Fortunato, V. Assunção, A. Gonçalves, A. Marques, A. Pimentel, H. Águas, L. Pereira, I. Ferreira, R. Martins, 2004

3.6. MEMBER OF SCIENTIFIC BOARDS

Member of the scientific board of DCM (since 2002)

Member of the Scientific and Technological board of *Lógica, E.M*. (Portuguese enterprise associated with certification and test of solar clell panels, installed in Moura, Portugal)

Member of Scientific board of CENIMAT/I3N

3.7. ADMINISTRATIVE POSITIONS

Member of the executive board of the Materials Science Department-DCM (since 2007) - responsible by the coordination of activities related to dissemination, organization of events, and maintenance of laboratories and infrastructures.

Member of the executive board of CENIMAT as Sub-director - responsible by the coordination of the annual scientific reports, organization of events and dissemination.

The organizational structure of DCM is divide in three groups. I'm the responsible for group of Electronic Materials and Nanotechnologies, formed by 6 Professors.

4. SOCIAL IMPACT

4.1. SPREAD SCIENTIFIC INFORMATION IN THE EDUCATIONAL COMMUNITY

During the last decade I have been strongly involved in the dissemination activities of the Materials Science Department at the high schools as well in promoting events related with DCM global research and teaching activity coordinated by FCT-UNL or promoted by CENIMAT/I3N to which I would like to highlight events that take place every year such as:

- ✓ Open day Organized by FCT;
- ✓ the Summer School event organized by CENIMAT under the auspices of the Portuguese National Science Foundation;
- ✓ the week of Education and Science, promoted by Almada Municipality

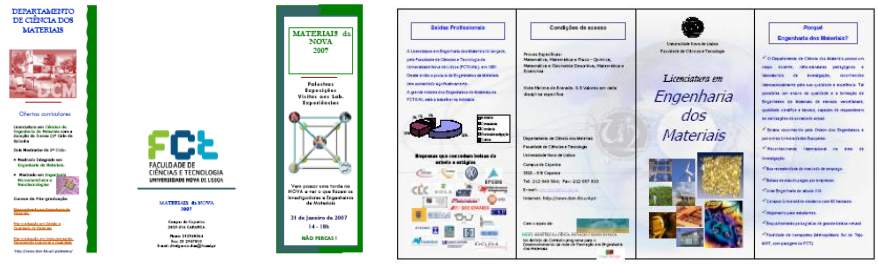
As a specialist in photovoltaics energy conversion I received several invitations to give talks at Secondary School and Workshops, just some examples are given below:

LOGICA (Moura, Portugal)- workshop in renewable energy
"O Futuro da Energia fotovoltaica em Portugal_ The Future of photovoltaic Energy in Portugal"
INOVA – workshop organized by BEST at FCT-UNL
“Materiais para a produção ecológica de energia -Materials for ecological energy production” – May 2007

Also several talks were given at secondary school where simultaneously the scientific content of the Materials Science Engineering was disseminated. Examples are the following:

- ✓ *"Relevance of Materials Engineer in the actual society" given to:*
  - “Escola Secundária Monte de Caparica - Weak of Sciences” – Fev 2005; Talk: Renewable Energies.
  - “Escola Secundária de Santo André” – Weak of Sciences” – Jun 2005; Talk: Renewable Energies.
  - “Escola Secundária Anselmo de Andrade” – Environment day – Jun 2007; Talk: Renewable Energies.

- ✓ Organization of visits to secondary schools and visits of students to Department of Materials Science, for which I was involved in the realization of several material for promotion such as **flyers, poster and outdoors**. Examples:



VISIT OF STUDENTS, SELECTED EXAMPLES

Photo of students reception Photo of secondary teachers visit to DCM

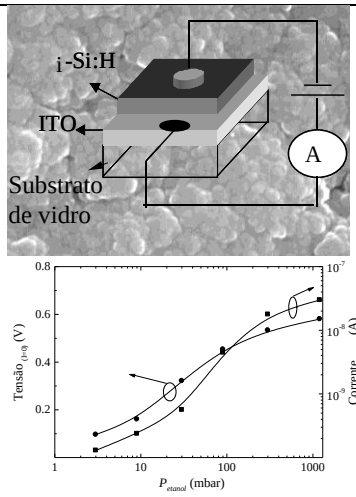
Photo of students visiting the labs of DCM

Complementary information in the file ***schools dissemination***

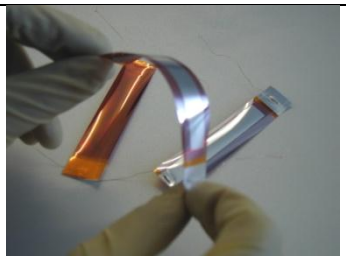
4.2. PROTOTYPES DEVELOPED

To help the dissemination of our scientific activity several prototypes produced in the framework of the research as highlighted in the *Research Statement* were used some examples are the following:

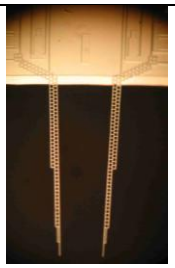
1. Amorphous and nano/microcrystalline silicon based device applications

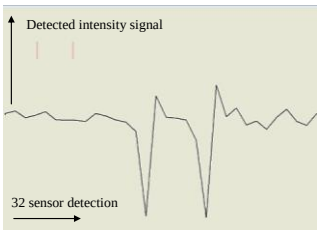


Application of porous amorphous silicon produced by Hot wire CVD as ethanol sensor. Pioneer demonstration that porous silicon can be used in fuel cells

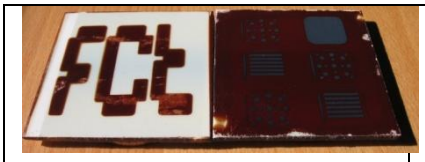


Flexible position sensitive detectors based on amorphous silicon produced by hot-wire technique. *1D- position sensitive detectors.*



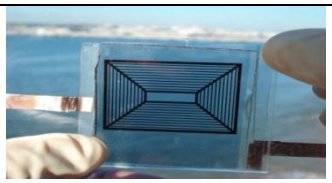


Pioneer application of amorphous silicon detectors to recognition of micro-objects. *Detection of a micro-cantilever with a position sensitive detector placed in an optical microscope.*



Solar tiles - demonstration of the possibility to produce amorphous silicon solar cell in ceramic substrates using different designs.

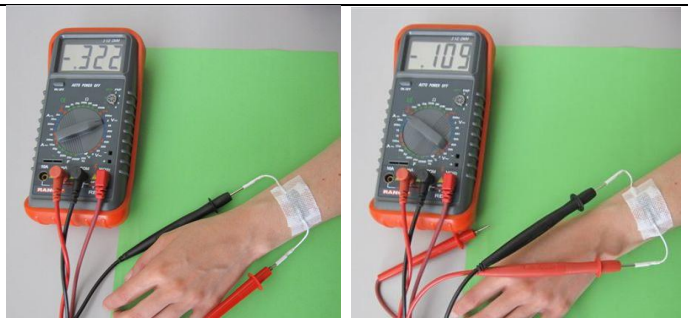
Semi-transparent solar cell developed in 10cmx10cm substrate at CENIMAT with microelectronic processes



Smart windows: first demonstration of the integration of electrochromic windows with semi-transparent photovoltaic energy.

2. Thin films for batteries

Paper batteries to supply voltage for controlling the gate of a paper transistor. *Integrated paper battery in a sheet of paper*



Bio-batteries made with sub-micrometer fibers of cellulose acetate. *Current and voltage measured with a multimeter of a biobattery in contact with sweaty skin*

4.3. PROGRAM "CIÊNCIA VIVA"

In the last years I have been responsible for the organization at CENIMAT of the program "Ciência Viva" that aims to bring students from the high school to stay one week at CENIMAT integrated in specific research activities. In the following I show some examples of these activities (the ones that I'm also the scientific responsible):

Complete list of Internships (edition 2011)

770. Electrónica Transparente
771. Sabias que podes fazer electrónica com uma impressora a jacto de tinta?
772. Janelas inteligentes à base de materiais electrocrómicos
773. Nanotecnologias – ver com electrões e fazer com iões
1218. Olhos mágicos que detectam ADN

1849. Sabias que os pixeis do teu PC podem detectar pH e ADN?
1508. Energias renováveis: fabrico de células solares fotovoltaicas -
1510. Produção e caracterização de bio-baterias
1770. Baterias de papel
2037. Produção e caracterização de óxidos termocrómicos
2053. Produção de nanofibras para aplicações médicas

4.4. Dissemination Trough Media

The work related to paper batteries have attacked considerable interest of the media as can be seen by the examples.

- *Pesquisadores portugueses criam bateria de papel, tecnologia.terra.com.br › Notícias › Tecnologia; 25 jan. 2011 – Fernando Daquino Pesquisadores da Cenimat (Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa) desenvolveram* as ...- http://tecnologia.terra.com.br/noticias/0,,OI4910821-EI12882,00-Pesquisadores+portugueses+criam+bateria+de+papel.html

- *Baterias de Filme Fino de Papel - SciELO - MCTES; www.scielo.oces.mctes.pt/scielo.php?pid=S0870...script=sci..de B Brás - Artigos relacionados*

- *DIA MUNDIAL DOS MATERIAIS 2009 - 2ª Menção Honrosa SPM. Baterias de Filme Fino de Papel. B. Brás* , I. Ferreira. FCT-UNL.*

- Baterias em papel e a tecnologia Invisível - *http://noticias.sapo.pt/info/artigo/1182325*

- A primeira bateria de papel é portuguesa - http://www.cienciahoje.pt/index.php?oid=47060&op=all

- Água consegue carregar baterias de papel - http://www.revolucaodigital.net/2011/01/28/agua-carregar-baterias-papel/

- Portugueses criam bateria de papel que se carrega com... água Leia mais em: http://tugatech.com.pt/t3029-portugueses-criam-bateria-de-papel-que-se-carrega-com-agua#ixzz1er3xzoBV

- Investigadores portugueses inventam baterias de papel - http://www.fibra.pt/conteudos/720-investigadores-portugueses-inventam-baterias-de-papel-.html

- Baterias de Papel Auto-recarregáveis Portuguesas - http://abertoatedemadrugada.com/2011/01/baterias-de-papel-auto-recarregaveis.html

- Investigadores nacionais criam baterias de papel - http://www.boasnoticias.pt/noticias_Investigadores-nacionais-criam-baterias-de-papel_5171.html

- Baterias de Papel - http://www.falarglobal.com/final/videos.htm?id=225&cat=ciencia&tipologia=entrevista

- Criaram baterias de papel, que se carregam através da humidade - http://targethd.net/2011/01/26/criaram-baterias-de-papel-que-se-carregam-atraves-da-umidade/

- Baterias de papel, made in Portugal - http://joserosafilho.wordpress.com/2011/08/07/baterias-de-papel-made-in-portugal/

- Pesquisadores portugueses criam bateria de papel - http://tecnologia.terra.com.br/noticias/0,,OI4910821-EI12882,00-Pesquisadores+portugueses+criam+bateria+de+papel.html

- Vantagens e aplicações das baterias de papel e das biobaterias… - http://biomedicaltopics.net/vantagens-e-aplicacoes-das-baterias-de-papel-e-das-biobaterias%E2%80%A6/

- A energia do papel - http://aeiou.exameinformatica.pt/gen.pl?p=kwds&words=baterias%20papel

- Portugueses desenvolvem bateria de papel recarregada por vapor - http://eco4planet.com/blog/2011/03/portugueses-desenvolvem-bateria-de-papel-recarregada-por-vapor/

- *Bateria de papel é recarregada com vapor d'água | BIO-IDÉIAS: O ...www.bio-ideias.com/2011/.../bateria-de-papel-e-recarregada-com.ht... 28 fev. 2011 – BIO-IDÉIAS: O melhor da Biologia: Bateria de papel é recarregada com vapor d'águaEsse blog partilha informações e conhecimento ...*

Campus de Caparica, November 25th, 2011

Isabel Ferreira