

# Short Curriculum Vitae

## CHARALAMPOS SARAFIDIS

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### Personal data

Birthdate / place : 21-07-1974, Thessaloniki

Marital Status : Married, two children

Academic Education : Physics Diploma (1997), MSc Materials Science (2000), MSc IT (2017)

### Doctoral Dissertation

Synthesis and study of structural and magnetic properties of  $R_3(Fe_{1-x}Co_x)_{29-y}T_y$  ( $R = Nd, Tb, Dy, Y, T=Ti, V$ ) intermetallic compounds (2004).

The dissertation is available online through the National Documentation Centre (Dissertation Code 14803, hyperlink <http://thesis.ekt.gr/14803>).

### Positions held

2016-present Assistant Professor in Applied and Environmental Physics sector, Dept. of Physics, Aristotle University of Thessaloniki

2014-2016 Lecturer, Dept. of Physics, Aristotle University of Thessaloniki

2012-2014 Postdoctoral researcher in Institute of Advanced Materials, Physicochemical Procedures, nanotechnology and Microsystems (now INN) of NCSR "Demokritos", Athens.

2004-2012 Research and Teaching fellow at Technological Educational Institute, Sindos.

2006-2010 Researcher at Electrical Measurements Directorate (Time and Frequency laboratory) of Hellenic Metrology Institute.

2004-2006 Postdoctoral researcher in Aristotle University of Thessaloniki.

### Notable Activities - Achievements

Referee in many peer reviewed international scientific journals (including Ionics, J. Magn. Magn. Mat., J. Alloys Comp., Physica B).

Experience in large research facilities.

Member of the EURAMET Technical Committee for Time and Frequency (2008-2010).

Hellenic National Time (UTC(EIM)) operator (2008-2010). Established traceability to international BIPM prototype (UTC).

Production for the first time worldwide of MnBi type magnets, used to manufacture a prototype motor by Wittenstein Cyber Motors (within EU-funded "REFREEPERMAG, Rare-earth Free Permanent Magnets" project).

Member of the organizing committee in international and local conferences.

Organized training seminars for private organizations and National Metrology Institutes in measurements' methodology and laboratory organization.

Member of "Mag-net" network.

Member of the Hellenic Physicists' Society.

Member of the Hellenic Company of Physics for Science and Education.

Member of the Federation of European Materials Societies (FEMS) through the Hellenic Society for the Science and Technology of Condensed Matter (HSSTCM).

### **Academic Experience**

Lectured 16 different subjects in academic education both in pre-graduate and post graduate programs, including basic courses for Electricity and Magnetism, Magnetic Materials and Applications, Training in Research Methodology Laboratory, Magnetic Materials' Characterization.

Supervised 11 pre graduate and post graduate bachelor and diploma theses. A short indicative selection:

- July 2015 : "Synthesis and characterization of MnBi nanoparticles for permanent magnet applications", by Mrs Kanari Konstantina, post graduate program of Nanosciences and Nanotechnology (co-supervising). Mrs Kanari continued her studies in UK for a PhD in the field of advanced materials. ([link](#))
- January 2017 : "Synthesis and characterization of Mn-Fe-Ga nanoparticles for permanent magnet applications", by Mr. George Sempros, post graduate program of Nanosciences and Nanotechnology (co-supervising). ([link](#))
- July 2017 : "Study of magnetic and structural properties of MnGaAl system" by Mrs. Christina Karra, student of Physics department. Mrs Karra continued her studies in post graduate level in the field of materials science. ([link](#))
- September 2017 : "Study of magnetic and structural properties of MnCoBi system" by Mrs. Oikonomou Aspasia, student of Physics department. Mrs Oikonomou continued her studies in post graduate level in the field of materials science. ([link](#))
- November 2018 : "Structural and magnetic characterization of  $\text{CoFe}_{2-x}\text{RE}_x\text{O}_4$  (RE=Dy, Yb, Gd) nanoparticles for magnetic hyperthermia applications" by Mrs Koutsoumpou Ksanthippi, post graduate program of Nanosciences and Nanotechnology (co-supervising). ([link](#))

### **Laboratory Experience**

Metallurgical methods for producing materials in various forms, Arc-Melting, Induction Melting, Melt Spinning, Ball Milling.

Interstitial modification of intermetallic compounds.

Production and treatment of materials through exchange reactions.

Special types of specimen like bonded pseudo-monocrystals.

Impedance Spectroscopy for the study of electrical and electrochemical properties of materials.

X-ray diffraction, Rietveld analysis, determination of magnetocrystalline anisotropy.

Magnetic Measurements with VSM and SQUID magnetometry, determination of magnetic parameters.

Mössbauer spectroscopy.

Large scale facilities experience.

Electrical and Time – Frequency measurements with high precision. Instruments calibration.

LIDAR test bench development.

PC – Instrument interconnection, integration of experimental apparatuses, networking, measurements retrieval through network.

Laboratory Quality System according to ISO 17025:2005.

### **Research Interests and Experience**

My basic research activity focuses on design, synthesis and structural and magnetical characterization of magnetic materials, mostly focused on materials suitable for applications as permanent magnets. During the last years I have worked on binary, ternary and quaternary intermetallic compounds and Heusler alloys, materials which may possibly replace rare earth compounds in some applications as permanent magnets but I also work on lean Rare Earth – transition metals intermetallics. I am interested in designing new stoichiometries based on semi empirical methods like the Mendeleev number or based on ab initio theoretical calculations; the stabilization of such compounds with various metallurgical –industry compatible- methods and the optimum processing. I am working on the structural (crystallographic) analysis, mostly with X-Ray diffraction and the correlation of the obtained structure with the magnetic properties as determined with VSM-SQUID magnetometry, Mossbauer spectroscopy and other techniques. I have vast experience in these experimental techniques and analysis of the results. I have work experience in large facilities.

I am also interested in structural, electrical and transport properties of ionic conductors and ceramic oxides in general with emphasis on Fe and Co oxides. My work focuses on the structural characterization, mostly with XRD, the chemical characterization and the electrochemical properties mostly with impedance spectroscopy.

Another research field I am interested is the design and development of experimental apparatuses, especially in the integration of different components, the connection with personal computers and the development of relevant software. I developed an impedance spectroscopy apparatus still in use and the upgrade of a Mössbauer Spectroscopy set up, both located on the Magnetic Measurements laboratory in Physics department.

I have also worked for some years in the field of Metrology, in the electrical and time and frequency field. Since 2006 I was occupied with the task of connecting the Hellenic National Time and Frequency Standard to the International BIPM Standard and the development of the laboratory procedures and quality system (according to ISO 17005 standard) and the capabilities of the national laboratory. As a result, the National Time and Frequency Laboratory, since September 2007 sends regularly data from its Atomic Clocks to the Bureau International des Poids et Mesures (BIPM) and is included in the relevant publications. I have also worked in the field of precise time transfer within wireless links, cable links and through the internet. This experience has been proved relevant to my other research activities, for example Mössbauer spectroscopy is also a technique which heavily depends on time synchronization.

### **Funded Research and Development Projects**

I have participated in 7 research and development projects (PI in 1). An indicative selection:  
2007 – 2008: “New nanocomposite hard magnets by melt spinning and mould casting: synthesis, characterisation, applications”, Institute of Nanoscience and Nanotechnology, NCSR «Dimokritos», AUTH Physics Department, National Institute of R&D for Technical Physics, Iasi, Romania. Funding by GSRT, in Romania-Greece partnership. Coordinator: M. Gjoka  
2012 – 2014: “REFREEPERMAG, Rare-earth Free Permanent Magnets”, funding by European Commission (FP7), Institute of Nanoscience and Nanotechnology, NCSR «Dimokritos» in consortium with 12 public and private organizations from 6 EU countries. Coordinator: D. Niarchos.

2016 – 2017: “Support of new researchers: Advanced Magnetic Materials” Award Funding by AUTH Research Committee. Coordinator: **C. Sarafidis**

### **Publications**

I have co-authored 44 publications in peer reviewed journals and peer reviewed journals related with conferences and refereed proceedings of international conferences; 64 presentations at international and local conferences; more than 200 citations (excluding self-citations), h-index=8. Large amount of educational material for the courses I am engaged with.

### **Selected publications and conference presentations**

Evolution of Nd<sub>2</sub>Fe<sub>14</sub>B nanoparticles magnetism during surfactant-assisted ball-milling  
Intermetallics **19** (2011) pp. 589-595

K. Simeonidis, C. Sarafidis, E. Papastergiadis, M. Angelakeris, I. Tsiaoussis, O. Kalogirou.  
DOI: 10.1016/j.intermet.2010.12.012

Structure and Magnetic Properties of Boron Doped Fe<sub>50+x</sub>Cu<sub>25-x</sub>M<sub>25</sub> (M = Al, Ga) and Fe<sub>50+x</sub>Co<sub>25-x</sub>Ga<sub>25</sub> Heusler Alloys

IEEE Transactions on Magnetics **50**(11) (2014) pp. 2103704

C. Sarafidis, M. Gjoka, C. Wang, G. Hadjipanayis, O. Kalogirou, D. Niarchos  
DOI: 10.1109/TMAG.2014.2325901

Toward Rare-Earth-Free Permanent Magnets: A Combinatorial Approach Exploiting the Possibilities of Modeling, Shape Anisotropy in Elongated Nanoparticles, and Combinatorial Thin-Film Approach

JOM **67**(6) (2015) pp. 1318-1328

D. Niarchos, G. Giannopoulos, M. Gjoka, **C. Sarafidis**, V. Psycharis, J. Ruzs, A. Edstrom, O. Eriksson, Peter Toson, Josef Fidler, E. Anagnostopoulou, U. Sanyal, F. Ott, L.-M. Lacroix, G. Viau, Cristina Bran, Manuel Vazquez, L. Reichel, L. Schultz, and S. Fahler

DOI: 10.1007/s11837-015-1431-7

Effective impregnation for the preparation of magnetic mesoporous carbon: application to dye adsorption

J. Chem. Technol. Biotechnol. **92** (2017) pp. 1899-1911

H.S. Saroyan, D.A. Giannakoudakis, **C.S. Sarafidis**, N.K. Lazaridis and E.A. Deliyanni  
DOI: 10.1002/jctb.5210

Processing of magnetically anisotropic MnBi particles by surfactant assisted ball milling

J. Magn. Magn. Mater. **426** (2017) pp. 691-697

K. Kanari, **C. Sarafidis**, M. Gjoka, D. Niarchos, O. Kalogirou  
DOI: 10.1016/j.jmmm.2016.10.141

Carbon-encapsulated cobalt nanoparticles: synthesis, properties, and magnetic particle hyperthermia efficiency

J. Nanopart. Res. **19** (2017) pp. 399

A. Kotoulas, C. Dendrinou-Samara, **C. Sarafidis**, Th Kehagias, J Arvanitidis, G Vourlias, M Angelakeris, O. Kalogirou  
DOI: 10.1007/s11051-017-4099-9

Structural and Magnetic Properties of Fe Doped Mn-Ga Ribbons  
EPJ Web of Conferences **75** (2014) pp. 03004

**C. Sarafidis**, M. Gjoka, O. Kalogirou, N. Lupu, G. Ababei and D. Niarchos

Towards Rare Earth Free Permanent Magnets: A combinatorial approach  
Scarcity of Rare Earth Materials for Electrical Power Systems, NATO Meeting Proceedings STO-MP-AVT-231, November 2014.

D. Niarchos, G. Giannopoulos, M. Gjoka, **H. Sarafidis**, A. Markou, V. Psycharis

DOI: 10.14339/STO-MP-AVT-231

Rare Earth Free Permanent Magnets

Proceedings of The 23rd International Workshop on Rare Earth and Future Permanent Magnets and Their Applications (REPM2014) pp. 388

G.Giannopoulos, **C. Sarafidis**, M.Gjoka, L. Reichel , A. Markou, W. Wallisch, V. Psycharis, J. Fidler and D. Niarchos

Effects of milling conditions on the magnetic properties of MnBi alloys

Magnetics Conference (INTERMAG), IEEE 2015 Beijing

M. Gjoka, **C. Sarafidis**, G. Giannopoulos and D. Niarchos

DOI: 10.1109/INTMAG.2015.7157188

Structure and magnetic properties of  $\text{Sm}_{1-x}\text{Zr}_x\text{Fe}_{10}\text{Si}_2$  ( $x=0.2-0.6$ ) alloys

Journal of Physics: Conf. Series 903 (2017) 012033

M. Gjoka, **C. Sarafidis**, V. Psycharis, E. Devlin, D. Niarchos and G. Hadjipanayis

DOI: 10.1088/1742-6596/903/1/012033

Synthesis, processing and characterization of FeMnGa nanoparticles for permanent magnet applications

Materials Today:Proc. **4** (2017) pp. 6948-6953

G. Sempros, K. Kanari, **C. Sarafidis**, M. Gjoka, N. Lupu, G. Ababei, D. Niarchos, O. Kalogirou

DOI: 10.1016/j.matpr.2017.07.024

Carbon-encapsulated cobalt nanoparticles: synthesis, properties, and magnetic particle hyperthermia efficiency

J. Nanopart. Res. **19** (2017) pp. 399

A. Kotoulas, C. Dendrinou-Samara, **C. Sarafidis**, Th Kehagias, J Arvanitidis, G Vourlias, M Angelakeris, O. Kalogirou

DOI: 10.1007/s11051-017-4099-9

Magnetic properties of Co-doped MnBi

European Congress And Exhibition On Advanced Materials And Processes (EUROMAT2017), Thessaloniki, Greece

K. Kanari, **C. Sarafidis**, M. Gjoka, G. Sempros, O. Kalogirou

Structural and magnetic properties of Mn-based ribbons containing Al  
European Congress And Exhibition On Advanced Materials And Processes (EUROMAT2017),  
Thessaloniki, Greece

**C. Sarafidis** and M. Gjoka

Effects of Milling Conditions on the Magnetic Properties of MnBi Alloys

7th Joint European Magnetic Symposia (JEMS2015), Beijing, China

M. Gjoka, **C. Sarafidis**, G. Giannopoulos, D. Niarchos

Structure And Magnetic Properties Of  $\text{Hf}_2(\text{Co}_{1-x}\text{Fe}_x)_{11}\text{B}$  Melt-Spun Alloys

5th Joint European Magnetic Symposia (JEMS2013), Rhodes, Greece

M. Gjoka, **C. Sarafidis**, G. Ababei, N. Lupu, S. Makridis, O. Kalogirou and D. Niarchos

Structure and Magnetic Properties of Boron Doped  $\text{Fe}_{50+x}\text{Cu}_{25-x}\text{M}_{25}$  ( $\text{M} = \text{Al}, \text{Ga}$ ) and  $\text{Fe}_{50+x}\text{Co}_{25-x}\text{Ga}_{25}$  Heusler Alloys

6th Joint European Magnetic Symposia (JEMS2014), Dresden, Germany

**C. Sarafidis**, M. Gjoka, C. Wang, G. Hadjipanayis, O. Kalogirou, D. Niarchos

Rare Earth Free Permanent Magnets

Proceedings of The 23rd International Workshop on Rare Earth and Future Permanent Magnets  
and Their Applications (REPM2014) pp. 388

G.Giannopoulos, **C. Sarafidis**, M.Gjoka, L. Reichel , A. Markou, W. Wallisch, V. Psycharis, J.  
Fidler and D. Niarchos

Effects of milling conditions on the magnetic properties of MnBi alloys

Magnetics Conference (INTERMAG), IEEE 2015 Beijing pp. 1

M. Gjoka, **C. Sarafidis**, G. Giannopoulos and D. Niarchos

DOI: 10.1109/INTMAG.2015.7157188

Effect of Co substitution on structure and magnetic properties of  $\text{Nd}_{0.4}\text{Zr}_{0.6}\text{Fe}_{10-x}\text{Co}_x\text{Si}_2$   
( $x= 0-3$ ) alloys and their ribbons

The 25th International Workshop on Rare Earth Permanent Magnets and Advanced  
Magnetic Materials and Their Applications (REPM 2018), Beijing, China

M. Gjoka, **C. Sarafidis**, G. Giannopoulos, D. Niarchos, G. Hadjipanayis, J. A. Tabares,  
G. A. Pérez Alcázar and L. E. Zamora

Structural and magnetic properties of  $\text{NdFe}_{10-x}\text{Co}_x\text{Cr}_2$  alloys and their ribbons

The 25th International Workshop on Rare Earth Permanent Magnets and Advanced  
Magnetic Materials and Their Applications (REPM 2018), Beijing, China

**C. Sarafidis**, M. Gjoka, D. Niarchos, G. Hadjipanayis