

Curriculum Vitae

Personal information

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Date of birth: 04 July 1990
Gender: Female

Education

2014-Present: PhD in Chemistry (CATSUS Program, Catalysis and Sustainability), Instituto Superior Técnico, Universidade de Lisboa

2011-2013: MSc degree in Chemistry, Faculdade de Ciências, Universidade de Lisboa.

2008-2011: BSc degree in Chemistry, Faculdade de Ciências, Universidade de Lisboa.

Prizes and Awards

2013: “Programa de Estímulo à Investigação”. Fundação Calouste Gulbenkian awards the most promising and talented young scientists with this highly competitive and renowned programme.

Publications

[1] V. Rosa, S. Realista, A. Mourato, L. Abrantes, J. Henriques, M. Calhorda, T. Avilés, M. Drew, V. Félix, “1,1’-Bis(diphenylphosphino)ferrocene bridging two mono(cyclopentadienyl) cobalt moieties: Synthesis, structure, electrochemistry and DFT studies”, *J. Organomet. Chem.* **2012**, *712*, 52-56. DOI: 10.1016/j.jorganchem.2012.04.012

[2] P.N. Martinho, A.I. Vicente, S. Realista, M. S. Saraiva, A. Melato, L. P. Ferreira, M.D. Carvalho, “Solution and solid state properties of Fe(III) complexes bearing N-ethyl-N-(2-aminoethyl)salicylaldiminate ligands”, *J. Organomet. Chem.* **2014**, *760*, 48-54. DOI: 10.1016/j.jorganchem.2013.12.028

Posters

[1] 1,1' – bis(diphenylphosphino)ferrocene bridging two mono(cyclopentadienyl) cobalt moieties: synthesis, structure, electrochemistry and DFT studies, Maria J. Calhorda, Vitor Rosa, Sara Realista, Ana Mourato, Luisa Maria Abrantes, João Henriques, Teresa Avilés and Vitor Félix, XXV Internacional Conference Organometallic Chemistry, September 2012, Lisbon, Portugal.

[2] Novos complexos com ligandos bidentados de azoto para catálise, M.J. Calhorda, B. Cardoso, S. Realista, V. Félix, Meeting of the Sociedade Portuguesa de Química, July 2011, Braga, Portugal.

[3] Modified electrodes based on binuclear complexes for electrocatalysis, S. Realista, P. N. Martinho, A. Melato, M.J. Calhorda, 46th Heyrovský Discussion on MOLECULAR ELECTROCHEMISTRY IN ORGANOMETALLIC SCIENCE, June 2013, Prague, Czech Republic.

[4] Modified electrodes for electrocatalysis: electropolymerisation based on binuclear metal complexes, S. Realista, P. N. Martinho, A. Melato, M.J. Calhorda, III Jornadas da eletroquímica e inovação, September 2013, Vila Real, Portugal.

[5] Binuclear Zinc Complexes for Green CO₂ Capture and Reduction, S. Realista, P. N. Martinho, A. Melato, M.J. Calhorda, 10th Inorganic Chemistry Conference of Sociedade Portuguesa de Química, April 2014, Costa da Caparica, Portugal.

[6] Schiff base metallopolymers for green CO₂ reduction, Sara Realista, Paulo N. Martinho, Ana I. Melato, Maria José Calhorda, 5th EuCheMS – Chemistry Congress, August 2014, Istanbul, Turkey.

Training

14-15 Feb 2013 – Meeting of Synchrotron Radiation Users from Portugal, Lisbon, Portugal.

28 Feb 2013 – Master class in advanced techniques for characterisation of materials, Lisbon, Portugal.

15-18 Jul 2012 - International Summer School – Euromaster measurement science in chemistry, Fátima, Portugal.

Area of Scientific Activity

My areas of interest are synthetic inorganic chemistry and electrochemistry. In the area of synthetic inorganic chemistry, I am skilled in the preparation and characterisation of new organometallic and coordination compounds. In the area of electrochemistry I have expertise in the preparation and characterisation of modified electrodes. In my MSc my focus was the study of electrocatalytic properties of dinuclear metal complexes and their ability to reduce oxygen. In my work I am firstly a synthetic chemist, preparing new examples of symmetric and asymmetric dinuclear complexes of nickel(II), copper(II) and zinc(II) for electropolymerisation. I also explore the electrocatalytic performance of these polymers on the oxygen reduction reaction which is a very important process in fuel cells. Since I started my research activity I have been trained in methods for synthesis and characterisation of molecular and polymeric samples. This has involved training in Schlenk techniques, purification techniques, infrared spectroscopy (FTIR and DRIFTS), NMR and VT NMR spectroscopy (diamagnetic and paramagnetic compounds), UV-vis spectroscopy (UV-vis and DRUV), cyclic voltammetry, chronoamperometry and electrochemical quartz crystal microbalance. I was also involved in the process of characterisation

of molecular and polymeric samples by other methods and techniques such as transmission electron microscopy, scanning electron microscopy, atomic force microscopy, powder X-ray and X-ray photoelectron spectroscopy.

Participation in Research Projects

Although of my very early stage research experience I already had the opportunity to work with two different research groups. My participation in these groups was very active resulting in good achievements.

Group of Theoretical and Inorganic Chemistry

My first participation in a research group was a year-long collaboration work as an undergraduate student during my last year of my degree in chemistry at the University of Lisbon. I worked under the supervision of Professor Maria José Calhorda on the organometallic chemistry of cobalt and ferrocene. I had the opportunity to develop good skills in organometallic synthesis and I made and characterised mono(cyclopentadienyl) cobalt complexes and immobilised them in mesoporous materials. We have also synthesised a highly unstable trinuclear cobalt and iron complex which I successfully characterised by cyclic voltammetry, the results of which were published in the Journal of Organometallic Chemistry. This was the first of many fruitful collaborations with the Interfacial Electrochemistry Group in Faculty of Sciences. During this period I was entrusted with increasingly serious lab duties reflecting the confidence of my host group in my technical skills. These included setting up the solvent stills, refilling liquid nitrogen containers, using a Schlenk line and independently characterising ligands and complexes by IR and NMR. I also attended seminars and courses regularly. Later as an MSc student I joined this group to develop my thesis working on the synthesis of symmetric and asymmetric nickel(II), copper(II) and zinc(II) complexes. I had the opportunity to deepen my knowledge in synthetic, characterisation and purification techniques. The work I developed during my MSc thesis was very productive which resulted in two submitted papers and three other articles in preparation.

Group of Interfacial Electrochemistry

Early as an undergraduate student and later as master student I joined the group of Interfacial Electrochemistry collaborating in many of their projects and also developing work related to my master thesis. While working on these projects, I acquired many complementary skills through modification of electrodes using electropolymerisation techniques. The characterisation of these modified electrodes introduced new techniques such as AFM, XPS, chronoamperometry and EQCM and gave me the opportunity to build on skills previously acquired.

Specialisation

I acquired expertise in using different techniques of synthesis, methods of characterisation and electrochemistry. Particularly I developed expertise in: (i) organic synthesis such as condensation reactions, substitution reactions; (ii) inorganic synthesis mainly complexation reactions and anion exchange; (iii) synthesis and characterisation of mesoporous silica materials; (iv) purification by recrystallisation and silica and alumina column chromatography; (v) solid and solution UV-vis studies at RT and VT; (vi) IR spectroscopy using KBr pallets and using NaCl cells for determinations with solutions; (vii) determination of redox properties of several coordination and organometallic compounds; (viii) potentiodynamic synthesis and characterisation of conducting polymers; (ix) NMR on a regular basis to characterise and identify organic ligands and

diamagnetic metal complexes; (x) EQCM studies such as growth and redox behaviour of conducting polymers.

Supervision Experience

In the academic year 2012/2013 I was an MSc student in Lisbon, Faculty of Sciences, under the supervision of Professor Maria José Calhorda, Dr Ana Melato and Dr Paulo Nuno Martinho. During this time I gained considerable experience in support to supervision of undergraduate students both from University of Lisbon and University Pierre and Marie Curie. I was responsible for helping the supervision of two students (one final year undergraduate biochemistry student and one final year exchange student) where they had the opportunity to be trained in the work routine of a research lab and have contact with techniques that are less explored during the taught course. Under my help to supervision the two students were taught how to carry out synthesis under dry and inert conditions where they had to learn how to use a Schlenk line and make filtrations using a canula. The biochemistry student was involved in the synthesis of Cu(I) complexes and the exchange student was involved in the preparation of amphiphilic Fe(III) complexes. With this responsibility I had the opportunity to develop skills in student supervision.

Personal skills and competences

Mother tongue Portuguese

Other languages

Self-assessment

European level

English

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	B2	B2	B2

Social skills and competences

- Team spirit
- Good ability to adapt to multicultural environments

Organisational skills and competences

- Good organisation and time management
- Good organisation in project management

Technical skills and competences

I acquired expertise in using different techniques of synthesis and methods of characterisation. Organic synthesis based on both wet and solvent free chemistry mainly condensation reactions, substitution reactions, complexation reactions. Purification methods: recrystallisation, column chromatography using silica and alumina. Hydrothermal synthesis, temperature dependent UV-vis spectroscopy, IR spectroscopy and NMR spectroscopy. I acquired experience in electrochemistry, mainly modification of electrodes by electropolymerisation (potentiostatic and potentiodynamic) of organic and inorganic monomers and their characterisation techniques such as cyclic voltammetry and EQCM.

Computer skills
and competences

- Good command of Microsoft Office™ tools

Good command of database searching, web of knowledge, Chemdraw, Topspin
Bruker NMR, Origin, Mestre Nova.