

Curriculum Vitae of Flávio Alberto da Silva Figueira

Flávio Alberto da Silva Figueira, was born in Funchal, Madeira, on December 8, 1982.
Institutional address: Department of Chemistry, University of Aveiro, 3810-193 Aveiro, Portugal.
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1 – Academic education and degrees

- Jan 09 - Present Ph.D. student in Organic Chemistry, Department of Chemistry, University of Aveiro, Portugal.
- Jan 07 - Dec 08 Master Degree in Inorganic and Biomedical Chemistry, Department of Chemistry, Faculty of Sciences of the University of Lisbon (final mark: Very Good).
- Nov 00 - Dez 06 Academic Degree in Technological Chemistry, Scientific Field – Chemistry, Faculty of Sciences of the University of Lisbon (final mark: 14 out of 20).

2. Domain of specialization and other skills/activities

2.1 Domain of specializations

The domain of specialization is in Organic Chemistry, namely in the synthesis of expanded porphyrinoid derivatives, radiofarmaceuticals and new ligands for homogeneous catalysis.

Currently the main focus is in the synthesis and supramolecular interaction of porphyrinoid derivatives.

2.2 Other skills/activities

- Purification proficiency in HPLC; preparative TLC; flash chromatography (normal and reversed phase);
- Ability to use spectroscopic equipment's of analysis such as NMR, MALDI-TOF-MS, UV-Vis and fluorescence equipment's.

3 – Main scientific area of research

Technological Chemistry

3.1 Present research interests

Expanded Porphyrinoid Chemistry:

The development of new porphyrinoid compounds specifically expanded porphyrinoid compounds has attracted the attention of many researchers in organic and inorganic chemistry. The synthesis and of expanded porphyrins produces systems with novel spectral and electronic features, cation-coordination, and, in many cases, an ability to bind anions in certain protonation states. The synthesis of new expanded porphyrins namely sapphyrins, pentaphyrins, hexaphyrins and even

higher homologues and fine-tuning of their characteristics can allow extended conjugation pathways and interesting derivatives for a wide variety of applications.

Anion Binding:

The development of pyrrole containing entities has emerged in the last few years as one of the most versatile and useful classes of anion-binding agents. They have been used in several applications, including sensing, transport, supramolecular structure stabilization, and DNA recognition. As a result, pyrrole-based anion receptors display richness in size, shape, structure and electronic characteristics (i.e. color and conjugation pathways). The main focus of research consists in the synthesis and supramolecular studies of cyclic and acyclic pyrrole based moieties. Currently, we are focused in the functionalization of hexapyrrolic and small acyclic systems containing pyrrole units with potential anion binding properties.

4 – Research stages

1. Three months of a Doc work on synthesis and studies of open chain triazole based receptors, with Prof. Jonathan L. Sessler (Department of Chemistry and Biochemistry, Institute for Cellular and Molecular Biology, The University of Texas at Austin, 1 University Station A5300, Austin, TX 78712-0165, USA; E-Mail: sessler@mail.utexas.edu), **2010**.
2. One year of a Scientific Stage on organometallic chemistry with Doctor João Galamba (Inorganic and Radiopharmaceutical chemistry group, Department of Chemistry, Instituto Tecnológico e Nuclear, Sacavém, Portugal ; E-mail: jgalamba@itn.pt) Lisboa, **2007**.
3. Six months of a scientific stage on homogeneous catalysis with Prof. Francine Agbossou (Université des Sciences et Technologies de Lille, 59652 Villeneuve d'Ascq Cedex France), E-Mail: francine.agbossou@ensc-lille.fr), **2006**.

5 - Participation in Research Projects

He has been involved in research projects with national and international scientists.

5.1 - Ongoing research support

As participant:

Project title: *Optical Sensors and Nanomaterials for Anion Recognition*, 2010; project on Chemistry, reference: *PTDC/CTM/101538/2008*.

6 – Participation at scientific meetings

1. XIII Encontro Nacional Sociedade Portuguesa Química (EN-SPQ), 12-14 June, **2013** (Aveiro, Portugal).
2. 3rd National Meeting on Medicinal Chemistry, 25-27 November, **2012** (Aveiro, Portugal).
3. 7th International Conference on Porphyrins and Phthalocyanines (ICPP-7), Jeju, (South Korea) July 1-6, **2012**
4. Research Day 13 June, **2012** (Aveiro, Portugal).
5. 3rd Portuguese Young Chemists Meeting (3Pychem), Porto, (Portugal), May 9-11, **2012**.
6. International Conference on Porphyrins and Phthalocyanines (ICPP-6), Albuquerque (USA), July 4-9, **2010**.
7. 2nd Portuguese Young Chemists Meeting, Aveiro (Portugal) May **2010**
8. 8th National Meeting on Organic Chemistry, Aveiro (Portugal), July 1-3, **2009**.

7 – Publications

7.1 – Thesis

1. Research Laboratory Thesis – PhD Middle Term Evaluation, *Synthesis of expanded porphyrins and related compounds with potential applications in medicine*, **2010**.
2. Master Degree in Chemistry - *Novos Complexos Organometálicos de Re(I)/99mTc(I) Contendo Derivados da L-Arginina: Síntese, Caracterização e Avaliação da Actividade Enzimática*. University of Lisbon, **2008**.
3. Academic Degree in Technological Chemistry - *New Phosphine-Oxazoline Ligands (PHOX) To Apply In Asymmetric Catalysis Of Imines*, University of Lisbon, **2006**.

7.2 – Papers in international scientific periodicals with referees

1. Palma, E., Oliveira, B.L., Figueira, F., Correia J.D.G., Raposinho P.D., Santos I., "A pyrazolylamine-phosphonate monoester chelator for the fac-[M(CO)₃]⁺ core (M=Re, 99mTc): Synthesis, coordination properties and biological assessment", *J. Label. Compd. Radiopharm.* **2007**, 50, 1176–1184.
2. Oliveira, B. L.; Raposinho, P. D.; Mendes, F.; Figueira, F.; Santos, I.; Ferreira, A.; Cordeiro, C.; Freire, A. P.; Correia, J. D. G., "Re and Tc Tricarbonyl Complexes: From the Suppression of NO Biosynthesis in Macrophages to in Vivo Targeting of Inducible Nitric Oxide Synthase", *Bioconjugate Chem* **2010**, 21 (12), 2168-2172.
3. Figueira, F.; Cavaleiro, J. A. S.; Tome, J. P. C., "Silica nanoparticles functionalized with porphyrins and analogs for biomedical studies.", *J Porphyr Phthalocya* **2011**, 15 (7-8), 517-533.
4. Figueira, F.; Pereira, P. M. R.; Silva, S.; Cavaleiro, J. A. S.; Tome, J. P. C., "Porphyrins and Phthalocyanines decorated with dendrimers: Synthesis and biomedical applications." *In Press*
5. Figueira, F.; Farinha, A. S. F.; Tomé A. C.; Sessler J. L.; Cavaleiro J. A. S.; Tomé J. P. C. "Synthesis of p-amino [28]hexaphyrins with potential application in anion binding." *Under Submission*
6. João P. C. Tomé, Flávio Figueira, Leandro M. O. Lourenço, Maria G. P. M. S. Neves, José A. S. Cavaleiro "Synthesis and characterization of novel 5,15-bis-aryl-10-monoglycoporphyrin derivatives" *Under Submission*

7.3 – Communications

Oral Communications

1. Bruno L. Oliveira, Flávio Figueira, João D. G. Correia, Paula D. Raposinho, Isabel Santos, António Ferreira, Carlos Cordeiro, Ana P. Freire, Re/99mTc Tricarbonyl Complexes Containing Guanidinium Moieties for Probing iNOS in vivo, 1st Portuguese Young Chemist Meeting, **2008** (Lisbon Portugal).
2. Flávio Figueira, "Expanded Porphyrins: Synthesis and Applications", Dia da Unidade QOPNA, **2010** (Aveiro, Portugal).
3. Flávio Figueira, João P. C. Tomé, Augusto C. Tomé, José A. S. Cavaleiro, "Synthesis of new bipyrrrole derivatives by a double aza-Michael addition reaction", 2nd Portuguese Young Chemists Meeting, **2010** (Aveiro, Portugal).
4. Flávio Figueira, Andreia S. F. Farinha, Augusto C. Tomé, José A. S. Cavaleiro, João P.C. Tomé, "Synthesis of novel bipyrrrolic compounds with potential application in anion binding", 3rd Portuguese Young Chemists Meeting (3Pychem), May 9-11, **2012** (Porto, Portugal).

5. Flávio Figueira, Andreia S. F. Farinha, Augusto C. Tomé, José A. S. Cavaleiro, João P. C. Tomé, “Polyamino-[28]hexaphyrins as anion binding agents”, XIII Encontro Nacional Sociedade Portuguesa Química (EN-SPQ), 12-14 June, **2013** (Aveiro, Portugal).

Poster Communications:

1. Flávio Figueira, João P. C. Tomé, Augusto C. Tomé, José A. S. Cavaleiro, A Convenient Method for the Synthesis of a bis(hydroxymethyl)bipyrrole, 8th National Meeting on Organic Chemistry, **2009** (Aveiro, Portugal).
2. Flávio Figueira, João P. C. Tomé, Augusto C. Tomé, Artur M. S. Silva, Jonathan L. Sessler, José A. S. Cavaleiro, “Synthesis and characterization of a novel sapphyrin using a N,N-disubstituted bipyrrole unit” (S7-039), Sixth International Conference on Porphyrins and Phthalocyanines (ICPP-6), , July 4-9, **2010** (New Mexico, USA).
3. Flávio Figueira, Clara Gomes, Dora Costa, João Rodrigues, Sandrina Silva, Patrícia Pereira, Andreia Farinha, José Cavaleiro and João Tomé “Synthesis of Porphyrins and Analogues for Photomedicinal and Environmental Applications”, Research Day 13 June, **2012** (Aveiro, Portugal).
4. Flávio Figueira, Andreia S. F. Farinha, Augusto C. Tomé, José A. S. Cavaleiro, Jonathan L. Sessler, João P. C. Tomé, “Synthesis of *p*-amino[28]hexaphyrins with potential application in anion binding”, 7th International Conference on Porphyrins and Phthalocyanines (ICPP-7), July 1-6, **2012** (Jeju, South Korea).
5. Flávio Figueira, José A. S. Cavaleiro, João P. C. Tomé, “Novel hexacationic hexaphyrin with potential application in PDI” 6th. Spanish Portuguese Japanese Organic Chemistry Symposium (6th. SPJ-OCS), July 18-20, **2012** (Lisbon, Portugal).
6. Flávio Figueira, Andreia Farinha, Augusto C. Tomé, José A. S. Cavaleiro, João P. C. Tomé, “Synthesis of novel *p*-diamino [28]hexaphyrins with potential application in anion transport“, 3rd National Meeting on Medicinal Chemistry, 25-27 November, **2012** (Aveiro, Portugal).
7. Carla F. Pereira, Sérgio M. F. Vilela, Flávio Figueira, Filipe A. Almeida Paz, João P. C. Tomé, “Synthesis of Tetra-Phosphonated Porphyrins for the Preparation of Metal-Organic Frameworks”, X Jornadas CICECO, 18-19 April, **2013** (Aveiro, Portugal)
8. Carla F. Pereira, Sérgio M. F. Vilela, Flávio Figueira, Filipe A. Almeida Paz João P. C. Tomé, “Synthesis of porphyrin-phosphonate derivatives for the self-assembly of Metal-Organic Frameworks”, XIII Encontro Nacional Sociedade Portuguesa Química (XXIII EN-SPQ), 12-14 June, **2013** (Aveiro, Portugal).
9. Andreia S. F. Farinha, Monica R. C. Fernandes, João M. M. Rodrigues, Flávio Figueira, João P. C. Tomé, Augusto C. Tomé, José A. S. Cavaleiro “Anion chemosensors based on pyrrolic macrocycles”, XIII Encontro Nacional Sociedade Portuguesa Química (XXIII EN-SPQ), 12-14 June, **2013** (Aveiro, Portugal).
10. Carla F. Pereira, Sérgio M. F. Vilela, Flávio Figueira, Filipe A. Almeida Paz, João P. C. Tomé, “Synthesis of Tetra-Phosphonated Porphyrins as Organic Ligands for the Preparation of Metal-Organic Frameworks”, X ENQO, 4-6 September, **2013** (Lisbon, Portugal)
11. Flávio Figueira, José A. S. Cavaleiro, João P. C. Tomé, “Novel pentacationic *N*-Fused Pentaphyrin” X ENQO, 4-6 September, **2013** (Lisbon, Portugal)

8 – Languages

In addition to Portuguese, he speaks English.