SHORT CURRICULUM VITAE
Prof. João Rocha

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João Rocha is Full Professor of Chemistry (1999) and Director of the University of Aveiro Institute of Materials (CICECO, ca. 480 people), largest and best rated Materials Science Institute in Portugal he founded in 2002.

EDUCATION

Ph.D. in 1990 from the Department of Chemistry, University of Cambridge, UK, working on solid-state NMR of kaolinite and related materials (supervisor Prof. Jacek Klinowski). This was followed by a post-doc (NMR of zeolite-type materials) in the same group. He obtained his 'Agregação' (Habilitation) in 1997 in the University of Aveiro, Portugal.

PRIZES AND HONOURS

• Rocha is *officer* of the Chemistry Division of the European Academy of Sciences – EURASC (2014) and was the first Portuguese scientist nominated to this Academy. He is one of the five permanent members of the Lisbon Academy of Sciences (created in 1779) since 2006. He is also Fellow of both the Royal Society of Chemistry (2016), and Chemistry Europe (2015).
• In 2012-2014, he was advisor for the Prime Minister of Portugal, as a member of the National Science and Technology Council (the only Chemist in this Council).
• He has received the prize Ferreira da Silva (highest distinction bestowed by the Portuguese Chemical Society, so far, to 16 Chemists) in 2016, the Madinabeitia-Lourenço award from the Real Sociedad Española de Química (2015), and the French-Portuguese prize from the Société Chimique de France (2020). In 2005, he received the prize for Scientific Excellence from the Portuguese Science Foundation, and in 1990 a prize from Emmanuel College, Cambridge.

SCIENTIFIC RECORD

• Rocha is one of the most cited Portuguese scientists, in all areas. He has published 510 SCI papers and 26 book chapters, with ca. 24,000 citations and Google Scholar h-index 75 (Scopus: ca. 20,000 citations, h=65), including in *Nature* and *Nature Nanotechnology* (2), and in the high-impact Chemistry and Materials journals, *viz.*, *Journal of the American Chemical Society* (12), *Angewandte Chemie* (9), *Advanced Materials* (3), *Advanced Functional Materials* (3), *ACS Nano* (3), *Biomaterials* (1), *Chemical Communications* (21), *Chemical Society Reviews* (2), *Coordination Chemistry Reviews* (2), and 5 patent applications. He ranks 25,013 among the 1000,000 top World scientists (Ioannidis *et al.*, *PLoS Biol.*, *17(8)*: e3000384, **2019**). He gave over 250 invited talks at conferences (mostly international). He has mentored 43 post-docs and 31 Ph.D. students (8 in progress). Luís Mafra, a CICECO researcher who did his Ph.D. and was mentored by Rocha recently received a *ERC Consolidator* grant to carry out work in the core business of the group.
• He has coordinated over two-dozen projects, which have received >7 M€, including funding by FCT and ANI, and European (as national PI): JOULE(II), 2 Human Capital and Mobility; Materials Network for the Atlantic Área (INTERREG IIIB); ENERMAT, Programme Espace Atlantic, 2007-2013 (INTERREG); Network of Excellence "Functionalized Advanced Materials Engineering of Hybrids and Ceramics (FAME)"; European, COST Action MP1202, "Rational Design of Hybrid Organic-Inorganic Interfaces: the Next Step Towards Advanced Functional Materials", ITN-Marie Sklodowska-Curie Actions, Doctoral Programme IDS-FunMat. He has consulted widely for industry. He has organized many (inter)national scientific events, the last of which was the "47th IUPAC World Chemistry Congress (Paris, July 2019)". Where he was Member of the Programme Committee, and co-organiser of Symposium T.3: *Hot Topics in Chemistry: a better world through Chemistry*.
• Rocha's present research group comprises 3 post-docs and 8 Ph.D. students and, soon, a Marie-Curie researcher.

MAIN SCIENTIFIC ACHIEVEMENTS

• Created a field of materials akin to zeolites: microporous silicates of transition metals and lanthanides (*ca.* 100 novel Ti, Zr, V, Nb, Cu, Sn, Ca, Y, Ce and other Ln silicates - AV and AM materials). To be clear, these are stoichiometric materials, *not* metal-doped zeolites, whose archetypal solid is titanium silicate ETS-10 (*Nature*, *367*: 347, **1994**). He has explored applications in luminescence (*J. Am. Chem. Soc., 137*: 3051, **2015**), catalysis, gas sorption and separation,

ion exchange, magnetism and as MRI contrast agents. Outstandingly, one zirconium silicate has found a real commercial application as a drug for the treatment of hyperkalemia.

• Developed sophisticated luminescent lanthanide-bearing Metal Organic Frameworks and coordination polymers (*Angew. Chem. Int. Ed., 47*: 1080, **2008**), in particular for nanothermometry (*Adv. Funct. Mater., 25*: 2824, **2015**).

• Designed a photoresponsive crystalline organic-inorganic hybrid ferroelectric material with a high Curie temperature (423 K), paving the way for accomplishing multiple-state ferroelectric memories, optical switches, and various optoelectronic devices (*J. Am. Chem. Soc., doi.org/10.1021/jacs.0c06048)*.

• Developed oxide nanoparticles for imaging contrast agents (*ACS Nano, 4*: 5339, **2010**), bimodal imaging (*Biomater., 33*: 925, **2012**), and thermometry (*Nature Nanotech*, *11*: 851, **2016**; *Adv. Mater., 35*: 4868, **2013**).

• Designed materials for small-drugs release (including NO, *J. Am. Chem. Soc., 133*: 6396, **2011**).

• Devised materials for a more sustainable World (including anti-mosquito nets, *ACS Appl. Mater. Interfaces*, *9*: 22112, **2017**; and uranyl capture *Angew. Chem., Intl. Ed.,* 58: 1, **2019**).

• Designed (*ca.* 40) heterogeneous catalysts based on mesoporous silicas derivatized with metal complexes (*J. Mater. Chem., 12*: 1735, **2002**).

• Elucidated the structure of minerals using NMR and XRD techniques (*J. Am. Chem. Soc., 113*: 7100, **1991**; *J. Am. Chem. Soc., 114*: 6867, **1992**; *Am. Mineral., 103*: 812, **2018**).

• Pioneered the development of solid-state NMR techniques for studying quadrupolar nuclei (*Solid State NMR, 21*: 61, **2002**; *Magn. Reson. Chem., 41*: 679, **2003**) and ^{1}H (*J. Mag. Reson., 199*: 111, **2009**).

SOCIETAL IMPACT

Rocha is perhaps best known for having extended the realm of zeolitic materials to transition metal and Ln silicate solids. In this context, he developed several microporous zirconium silicates. One such material (AV-13, *Inorg. Chim Acta, 356*: 19, **2003**), slightly modified, was eventually assessed (Rocha was consultant) by the US company ZS Pharma, now part of AstraZeneca, to treat hyperkalemia (excess K^+ in serum). The new drug *Lokelma* has been approved by FDA and the EMA and is now on the market.

A WORD ABOUT CICECO – AVEIRO INSTITUTE OF MATERIALS *(http://www.ciceco.ua.pt)*

• Under the initiative and leadership of Rocha, CICECO was created in 2002, and was one of 15 high-profile Portuguese research institutes financed by the National Science Foundation (FCT) in all areas of knowledge. Since its inception, Rocha has been CICECO's Director, and this is widely considered as a very important contribution he has given to the development of Portuguese Science.

• CICECO has granted international recognition, and is presently the largest (*ca.* 480 people, *ca.* 220 with a Ph.D.) research institute in the country dedicated to Materials Science and Engineering, and the best (top) rated in the last FCT research assessment. CICECO publishes over 500 SCI papers per year, it has a portfolio of some 180 patents, and its researchers have been awarded 8 ERC grants (1 *Starting*, 2 *Consolidator*, 2 *Advanced* and 3 *Proof of Concept*).

OTHER RELEVANT PROFESSIONAL ACTIVITIES

• Rocha has been in the Chemistry Department, University of Aveiro, since mid 1991 and was promoted to Full Professor of Inorganic Chemistry in 1999. He gave tutorials in Inorganic Chemistry and NMR while at Cambridge. He was invited Professor at Oviedo University in 2010. In Aveiro, he was responsible for courses on Inorganic, and Solid State, Chemistry.

• He was Vice-Director of the European Multifunctional Materials Institute, a follow up of the European Network of Excellence (FAME). He represented Portugal at the ESRF-Grenoble (2004-06) and at the Chairmen of the European Research Councils of Chemistry (2005-07). He was "Secretary" of the Portuguese Chemical Society (1998-2000).

• He was Chair (and is still a member) of the 'Commission on Inorganic and Mineral Structures' and is consultant of the 'Commission on NMR Crystallography and Related Methods' of the International Union of Crystallography (IUCr). He was editor of the *RSC Nanoscience and Nanotechnology* book series, Chair of the editorial board of *European Journal of Inorganic Chemistry* and was on the editorial board of *Solid State Nuclear Magnetic Resonance*. At present, he is a member of the editorial boards of *Chemistry - a European Journal*, and *Solid-State Sciences*, and editorial advisor for *BMC Chemical Engineering*.

• He has been coordinator and a member of assessment committees of the European Research Council Advanced and Starting Grants, IBM prize Portugal, ANR, LABEX (France), Portuguese Science Foundation (grants and research institutions), and has also reviewed projects and assessed research groups for France, Netherlands, Belgium, Luxembourg, UK, Austria. He is regularly called upon by the Portuguese Science Foundation (FCT) to coordinate the panel awarding post-doc and Ph.D. grants in Materials Science and Engineering, and in 2003 he headed the panel (of foreign scientists) that evaluated the Portuguese Materials Science and Engineering research groups. He has been a regular referee for the leading journals in Chemistry, Materials Science and NMR.

University of Aveiro, 23 January 2021.