University of Birmingham

Dr Antonio Feteira MSc, PhD

Senior Research Fellow

School of Chemistry

Contact details

Telephone +44 (0) 121 414 7813 (tel:+44 121 414 7813)

Fax +44 (0) 121 414 4403

Email a.feteira@bham.ac.uk (mailto:a.feteira@bham.ac.uk)

School of Chemistry
University of Birmingham
Edgbaston
Birmingham
B15 2TT
UK

About

Dr Antonio Feteira is a Birmingham Science City Senior Research Fellow and the Director of the Multiferroics Christian Doppler Lab.

Antonio has published over 40 research papers in the field of advanced functional oxides for electronics and acts as an associate editor for the Journal of the American Ceramic Society.

Antonio has received research grants from the Royal Society and the Christian Doppler Society.

Qualifications

- PhD in Materials Engineering 2004
- MSc in Ceramic Science and Engineering 1999

Biography

Antonio Feteira qualified with a BSc in Materials Engineering from the University of Aveiro (Portugal) in 1998. He went on to specialise in advanced functional oxides and awarded a MSc in Ceramics Science and Engineering from the University of Sheffield (UK) in 1999.

In 1999, he started working towards his PhD at the University of Sheffield (UK) within Profs. Reaney and Sinclair's groups and in collaboration with Morgan Electroceramics. During the period of his PhD studies he was awarded a Marie Curie Training Fellowship in Advanced Microscopy at the Max Planck Institut für Metallforschung (Germany) and a Worldwide Universities Network Scholarship to the Penn State University (USA).

Upon the conclusion of his PhD in 2004, he became a Postdoctoral research at the University of Sheffield (UK), working in advanced functional oxides within Prof. Sinclair's group. Between 2004 and 2007 he hold visiting research positions at Penn State University (USA) and Complutense University of Madrid (Spain).

In 2008, Antonio moved to Austria to work within the R&D research group of TDK EPC. Simultaneously, he acted as Visiting Lecturer at the University of Sheffield. One and half year later, he joined the School of Chemistry as a Birmingham Science City fellow and also became an Associate Fellow in the Department of Physics at Warwick University.

Since 2009, he is the Director of the International Module of the Christian Doppler Laboratory for Magnetoelectric Multiferroics

Teaching

Teaching Programmes

- CHM185
- CHM4M1

Postgraduate supervision

Antonio is interested in supervising doctoral research students in the following areas:

- Lead free piezoelectrics
- Low temperature firing oxides for electronics
- Multiferroic

Research

RESEARCH THEMES

- Solid state synthesis of lead free piezoelectrics, multiferroics and low temperature firing oxides for electronics.
- Electrical and mechano-electrical characterization of piezoelectrics.
- Characterisation of average and local structure in advanced functional oxides using X-ray diffraction combined with Electron Microscopy and Raman spectroscopy.

RESEARCH ACTIVITY

- **Lead free piezoelectrics**

Piezoelectrics are used in a multitude of applications ranging from fuel-injection actuators, printing heads, and micropositioning systems. The most successful piezoelectric ceramics are based on lead zirconate and lead titanate. Nevertheless, recent environmental legislation triggered the search for lead-free piezoelectrics. Antonio has been investigating $Bi_{1/2}Na_{1/2}TiO_3$-based piezoelectric ceramics in collaboration with Prof. Reichmann from the Graz University of Technology in Austria.

- **Low temperature firing oxides for electronics**

Most modern electronic components are manufactured by the reaction of several oxides at high temperatures to form particular crystal structures, which then offer specific functionalities. For example, compounds based on the perovskite structure, ABO_3, are technologically important because they exhibit a multitude of dielectric properties fulfilling many functions in modern electronics, such as charge storage, generation and sensing. 3D integration of these components required materials with firing temperatures lower than 960°C. Currently, he is investigating Tellurium-based oxides in collaboration with Dr. Tim Jackson from the School of Electrical Engineering.

- **Multiferroics**

Multiferroics are materials that show simultaneous ferromagnetic and ferroelectric ordering. In fact, they were studied into some degree in the 1960s and 1970s; however partly due to the inability to produce single-phase materials exhibiting both properties, this research field was gradually abandoned. The renaissance of magnetoelectric multiferroics during the present decade has been triggered by the potential of using these materials in emerging technologies, such as in tunable microwave applications.

Antonio's group have been investigating novel routes for multiferroics in collaboration with TDK EPC (Austria).

Publications

W. Krauss, D. Schütz, F. A. Mautner, A. Feteira and K. Reichmann, (2010). "Piezoelectric properties and phase transition temperatures of the solid solution of $(1 - x)(Bi_{0.5}Na_{0.5})TiO_3$–$xSrTiO_3$", **Journal of the European Ceramic Society**, Vol. 30, Iss. 8, p. 1827-1832

M.Li A. Feteira and D.C. Sinclair, (2009) Relaxor ferroelectric-like high effective permittivity in leaky dielectrics/oxide semiconductors induced by electrode effects: a case study of CuO ceramics**, Journal of Applied Physics**, Vol. 105, Issue: 11, Article: 114109

R. Rawal, A. J. McQueen, L. J Gillie, N. C. Hyatt, E. McCabe, K. Sarma, N. M. Alford, A. Feteira, I. M. Reaney and D. C. Sinclair, (2009) Influence of octahedral tilting on the microwave dielectric properties of $A_3LaNb_3O_{12}$ hexagonal perovskites (A = Ba, Sr), **Applied Physics Letters**, vol. 94, issue: 19, Article: 192904

L. Miranda, A. Feteira, D.C. Sinclair, K. Boulahya, M. Hernando, J. Ramirez, A. Varela J.M. Gonzalez-Calbet and M. Parras, (2009) Composition-structure-property relationships of 6H- and 12R-type hexagonal $Ba(MnTi)O_{3-d}$ Perovskites, **Chemistry of Materials**, Vol. 21, issue: 8, Pages: 1731-1742

A. Feteira, (2009) Negative temperature coefficient resistance (NTCR) ceramic thermistors: An Industrial Perspective, **Journal of The American Ceramic Society**, Vol. 92, Issue: 5, Pages: 967-983

A. Feteira and D.C. Sinclair, (2009) The influence of nanometric phase separation effects on the dielectric and magnetic properties of $(1-x)BaTiO_3$-$xLaYbO_3$ $(0 \leq x \leq 0.60)$ ceramics, **Journal of Materials Chemistry**, Vol. 19, Issue: 3, Pages: 356-35