

Curriculum Vitae

SURNAME: Irvine
FORENAMES: John Thomas Sirr
DATE OF BIRTH: 11/03/60 PLACE OF BIRTH: Enniskillen
TITLE: Professor NATIONALITY: British

HONOURS, DEGREES & PROFESSIONAL QUALIFICATIONS:

- EPSRC Senior Fellow 2006-2011
- BSc Hons in Chemical Physics, Edinburgh 1981
- DPhil "Photoelectrochemical Reduction of Carbon Dioxide" University of Ulster May 1986
- Royal Society of Edinburgh Support Fellow 1999-2000
- Royal Society of Edinburgh BP Research Fellow 1989-90
- Nuffield Science Research Fellow 1996-97
- Visiting Professor, Northwestern University, Jan-March 1994

CAREER HISTORY:

Lecturer, Senior Lecturer , University of Aberdeen	1990-93
Reader In Chemistry, St Andrews University	1994-99
Professor of Chemistry, St Andrews University	1999-
Director St Andrews Centre for Advanced Materials	2000-02,
CEO and Founder Director St Andrews Fuel Cells	2005-2007
CTO and Director St Andrews Fuel Cells Ltd.	2008-

INTERNATIONAL RECOGNITION:

- Stationary Fuel Cells Strategic Research Agenda Working Group Leader for the European Commission Hydrogen and Fuel Cell Platform
- Chairman European Science Foundation OSSEP programme 2001-2005
- Coordinator of two EU research training networks
 - HiT Proton
 - SOFC Anodes
- European Councillor International Society for Solid State Ionics 2005-9
- Member EU SOFCNet thematic network and SOFC600 and REALSOFC integrated projects
- Editorial Board, Journal of Materials Chemistry 2005-2008, International Advisory Board 2009-
- Editorial Boards International Journal for Nuclear Hydrogen Production, Materials Science B and Ionics

PUBLIC SERVICE:

- Co-founder and Director of Scottish Hydrogen and Fuel Cells Association, Chairman 2006-10
- North of Scotland Royal Society of Chemistry Secretary 1987-1990, Tayside RSC committee 2001-5
- Co-authored DTI/IOM Materials Foresight Report on Fuel Cells "Fuelling a Greener Economy"
- Member of FREDS working group on Hydrogen and Fuel Cells for Scottish Government

CONTRIBUTION TO DISCIPLINE:

- Established and coordinated MSci in Materials Science at St Andrews
- Co-established first 5-year MSci joint Chemistry and Physics degree in UK
- External examiner in Materials Engineering at Napier University 2001-6
- I have examined doctoral candidates in chemistry, materials, engineering, physics disciplines in UK, Switzerland, Spain, France, Singapore, Mexico, Australia, Sweden.
- Has organised several UK Electrochemistry symposia on Energy Conversion and Storage
- First RSC Solid State Group Secretary 1998-2000

MULTIDISCIPLINARY AND INTERDISCIPLINARY CONTRIBUTIONS:

- Lead in School of Chemistry contribution to St Andrews new undergraduate joint Humanities/Science degree in Sustainability
- Invited lectures to wide range of scientific and engineering organisations (RSC, IOM, IEEE, BA)

SERVICE TO SOCIETY:

Organised meeting for Scottish Environmental and Energy Foundation on Hydrogen Economy Apr 2003.
Presented to MSPs at two briefing meetings on renewable energy in last year
Presented to European MEP committee in 2005
Strong involvement in European Hydrogen and Fuels Cells Platform.
UK Representative, Fuel Cells Task Group - International Partnership for Hydrogen Energy.

KNOWLEDGE TRANSFER

Founding Director and CEO of St Andrews Fuel Cells Ltd, now CTO
7 Different Patents/Patent Applications
Recent collaborations with DSTL, Rolls Royce, BOC, Johnson Matthey, Ceres Power, HT Ceramix, Haldor Topsoe, Acumentrics, GS Yuasa, Bloom, Sasol

LECTURES

2001-2010 Overall >150 lectures – international, plenary/keynote, invited
For example September 2009 –February 2010
September Danish SERC meeting Risoe, Polish SOFC meeting Kracow, Scottish Hydrogen meeting Edinburgh, Hyceltech Portugal,
October ECS Vienna
November BARC Mumbai, Fucetech Conference Mumbai, Fuel Cell Meeting Albacete, Spain, Chalmers University Goteburg.
February Supergen Impedance Training school St Andrews, International Fuel Cell Workshop Postech Korea, UK Thai Bangkok

Major Research Grants

Awarding Body	Title	Period	Value(£)
EPSRC	Materials for High Temperature Fuel Cells	Jan 2004-Dec 2007	£430,000
EU - IP	Real SOFC Partner	Feb 2004-Jan 2008	£200,000
DSTL	Carbon Batteries	Apr 2004-Mar 2008	£300,000
NATO	Science for Peace 2	Sep 04-Aug 07	£7,334
BOC Foundation	LPG for SOFCs	Nov 04-Oct 07	£120,000
EPSRC/DSTL	Supergen Fuel Cells - Fuelling a Greener Future	July 05 - June 09	£530,000
EPSRC/Strathclyde	Strategic Innovation Award	Sept 05-Aug 10	£200,000
EU IP	SOFC600, Worktask leader	Feb 2006-Jan 2010	£180,000
EPSRC	Senior Fellowship	Sept 2006-Aug 2011	£530,000
SAFCL	Fuel Cell Development	May 2006-Apr 2008	£220,000
Carbon Trust	Fuel Cell Technology with SAFCL	Sep 2006-Aug 2008	£210,000
EPSRC/Carbon Trust	Carbon Vision Leadership Award	Apr 2007-March 2011	£500,000
EPSRC	Materials for HTFC 2- Platform Renewal	Jan 2008-Dec 2012	£1000,000
EPSRC/DTI	Rolls Royce Fuel Cell Development	Jan 2007-Dec 2009	£250,000
Int Copper Assoc	Cuprate SOFC cathodes	May 2007-Apr 2009	£50,000
Dorothy Hodgkin Aw	Overseas PhD	July 2007 – June 2010	£75,000
ONR	Joint Project with U Penn, SOFC Anodes	Dec 2006-Nov 2009	£50,000
EPSRC	Supergen Delivery of Sustainable Hydrogen	Oct 2008 – Sept 2012	£582,489
EPSRC	International collaboration in Chemistry enhancing direct photoelectrochemical conversion of CO ₂	Sept 2010 –Sept 2012	£223,494
EPSRC	Supergen - Powering a Greener Future	Sept 2009-Aug 2013	£894,845

CURRENT GROUP – 17 postdocs, 15 postgraduate students, 3 visitors, 2 technicians

PREVIOUS TRAINED RESEARCHERS 26 postdocs, 30 PhD students and 30+ research visitors

BIBLIOGRAPHY 240 publications

4 Nature group publications, h-index 34

10-Year-Track-Record

1. "A Redox-Stable, Efficient Anode For Solid-Oxide Fuel Cells", S. Tao and J.T.S. Irvine, *Nature Materials*, 2003, 2, 320-323. Times cited:192.
2. "Advanced Anodes for High-Temperature Fuel Cells", A. Atkinson , S Barnett, R.J. Gorte, J.T.S. Irvine , A.J. McEvoy, M. Mogensen, C. Singhal , J.Vohs, *Nature Materials*, 2004, 3, 17-27. Times cited: 217.
3. "Preparation and Characterisation of Apatite-Type Lanthanum Silicates by a Sol-Gel Process", S.W. Tao, J.T.S Irvine, *Materials Research Bulletin*, 2001, **36**, 1245-1258. Times cited 101
4. " High Temperature Neutron Powder Diffraction Study of the Oxide Ion Conductor $\text{La}_{0.9}\text{Ga}_{0.1}\text{Mg}_{0.2}\text{O}_{2.85}$ ", P.R. Slater, J.T.S. Irvine, T. Ishihara and Y. Takita, *J. Solid State Chem.*, 1998, 139, 135-143. Times cited: 83.
5. "Formation, Structure, and Stability of Titanate Nanotubes and Their Proton Conductivity", A Thorne, A Kruth, D Tunstall, JTS Irvine and W Zhou, *J. Phys. Chem. B.*, 109 (12); 2005, 5439-5444. Times cited: 71.
6. "Influence of Structure and Composition upon Performance of Tin Phosphate Based Negative Electrodes for Lithium Batteries", Mårten Behm, J.T.S. Irvine, *Electrochimica Acta*, 47, 2002, 1727-1738. Times cited: 48.
7. "Disruption of extended defects in solid oxide fuel cell anodes for methane oxidation", JC Ruiz-Morales, J Canales-Vasquez, C Savaniu, D Marrero-Lopez, Wuzong Zhou and JTS Irvine, *Nature*, 439, 2006, 568-571. Times cited: 56.
8. "Synthesis and Characterization of $(\text{La}_{0.75}\text{Sr}_{0.25})\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_{3-\delta}$, a Redox-Stable, Efficient Perovskite Anode for SOFCs", Shanwen Tao and John T. S. Irvine, *J. Electrochem Soc*, **151**, 2004, A252-A259. Times cited 99.
9. "Novel Tin Oxide Based Anodes for Lithium Batteries", F Belliard, P A Connor and J T S Irvine, *Solid State Ionics*, 2000, **135**, 163-167. Times cited 56
10. "A Stable, Easily Sintered Proton Conducting Oxide Electrolyte for Moderate Temperature Fuel Cells and Electrolysers", JTS Irvine, S Tao, *Advanced Materials*, **18**, 2006, 1581-1584. Times cited 51

Research monographs.

- Editor Fuel Cells - From Fundamentals to Systems, 2001, 1, Special Issue SOFC Anodes.
- Editor Solid State Ionics - SSPC13 special Issues, 178, Issues 7-10, 2007.
- Editor Journal of Materials Chemistry Special Issue "Hydrogen Production and Storage" 2008
- Electroceramics X Solid State Ionics Special Edition 2009
- European Solid Oxide Fuel Cell Conference 2010, J Power Sources Special Edition.

Patent applications under review and granted patents.

1. "Improvements in Fuel Cells and Related Devices". J.T.S. Irvine, F.G. Jones and P.A. Connor, _Brit. Patent Appl_. 2002, 0125276.6, WO2007091050-A1**granted, AU2002334198, ZL02820810.2.**
2. "Fuel Cell Electrodes", J.T.S. Irvine and S. Tao, Brit. Patent Appl. 2002, 0217794.79020115.3, 2003 international patent application GB 0217794.7, WO2004013925-A1, AU2003248994-A1**granted, ZL03818488.5,**
3. "Steam Electrolyser" A. Kruth, C. Savaniu, J.T.S. Irvine and S. Tao, Brit Patent Appl., 2004, GB0406818.5 and GB0427329.8 WO2005093130-A1; EP1730327-A1; US2007278092-A1
4. "Electricity producing Fuel Cell or Battery Device" J. Bradley, J.T.S. Irvine, J.B. Lakeman, Brit Patent Appl., 2004, GB0426879.3 WO2006061639-A2
5. "Electricity storage system comprises closed, reversible fuel cell having two electrodes separated by ionically conducting electrolyte, and two chambers to hold fuel and/or reaction product", JTS Irvine, JM Nairn, PA Connor et. al, 2003036746-A3, AU2002334198-A1
6. New Membranes for PEMFCs, PS Attidekou and John T.S. Irvine, Brit Patent Appl. 0921451.1 December 2009.

Invited presentations to peer-reviewed, internationally established conferences and/or international advanced schools (if applicable)

- 150+ , 13 since September

Organisation of International conferences in the field of the applicant

- Chair of 2010 European Solid Oxide Fuel Cells Conference in Lucerne
- Organising Committee RSC Dalton Discussion, St Andrews July 2004
- IO3M Symposium Organising Committee- Energy Materials, London April 2006
- RSC Faraday Symposium Organising Committee, July 2006
- Solid State Proton Conductors 13, Organiser St Andrews, September 2006

International Prizes/Awards/Academy memberships (if applicable)

- RSC Materials Chemistry Award 2009
- Francis Bacon Medal, RSC, 2003
- Elected Fellow of Royal Society of Edinburgh 2005
- International Power Sources Symposium Bourner Lecturer, 2003
- CoorsTek Materials Science Lecturer, Colorado School of Mines, 2001