

Solid Oxide Electrolysis:
Fuels and Feedstocks from
Water and Air

Faraday Discussion



13-15 July 2015
York, UK

Monday 13 July

11:30	Registration, Tea and Coffee	
12:25	Welcome and Introductions John Irvine, <i>Chair of Scientific Committee</i>	
12:35	Outline of Discussion Format Abigail Hallowes and Victoria Richards <i>Royal Society of Chemistry Publishing Editors</i>	
	Session Chair: John Irvine	
12:45	Introductory lecture: Surface modifications of $\text{La}_{0.8}\text{Sr}_{0.2}\text{CrO}_{3-\delta}$-YSZ dual-phase membranes for syngas production <u>John Hansen</u> <i>Haldor Topsøe A/S</i>	Paper 5970
	Session 1: Fundamental electrochemistry Session Chair: Ray Gorte	
13:30	Interpreting equilibrium-conductivity and conductivity-relaxation measurements to establish thermodynamic and transport properties for multiple charged defect conducting ceramics <u>Robert Kee</u> , Huayang Zhu, Sandrine Ricote and Grover Coors <i>Colorado School of Mines</i>	Paper 5978
13:35	Kinetics of CO/CO_2 and $\text{H}_2/\text{H}_2\text{O}$ reactions at Ni-based and ceria-based solid-oxide-cell electrodes <u>Christopher Graves</u> , Christodoulos Chatzichristodoulou and Mogens Mogensen <i>University of Denmark</i>	Paper 6151
13:35	Development of a diffuse reflectance infrared fourier transform spectroscopy (DRIFTS) cell for the in situ analysis of coelectrolysis in a solid oxide cell <u>Denis Cumming</u> , Rachael Elder, Christopher Tumilson, Rebecca Taylor, Sarayute Chansai, Ann Call, Johan Jacquemin and Chris Hardacre <i>University of Sheffield</i>	Paper 6149
13:40	Is the surface oxygen exchange rate linked to bulk ion diffusivity in mixed conducting Ruddlesden–Popper phases? <u>Steven McIntosh</u> , Alex Tomkiewicz, Mazin Tamimi and Ashfia Huq <i>Lehigh University</i>	Paper 6389
13:45	Discussion	
15:00	Afternoon Tea	
	Session 2: Materials Development Session Chair: Mogens Mogensen	
15:30	Surface modification of $\text{La}_{0.8}\text{Sr}_{0.2}\text{CrO}_{3-\delta}$-YSZ dual-phase membranes for syngas production <u>John Vohs</u> , Anthony Yu, Tae-Sik Oh, Ran Zhu, Alexa Gallegos and Raymond Gorte <i>University of Pennsylvania</i>	Paper 5980
15:35	Oxygen deficient layered double perovskite as an active Cathode for CO_2 electrolysis using a solid oxide conductor <u>Tae Ho Shin</u> , Jae-Ha Myung, Maarten Verbraeken, Guntae Kim and John T.S. Irvine	Paper 6143

	<i>University of St Andrews</i>	
15:40	Co-electrolysis of steam and CO₂ in full-ceramic symmetrical SOECs: a strategy for avoiding the use of hydrogen as a safe gas <u>Albert Tarancón</u> , Marc Torrell, Sergio García-Rodríguez, Alex Morata and Germán Penelas <i>Catalonia Institute for Energy Research (IREC)</i>	Paper 5982
15:45	Discussion	
17:00	Lightning presentations	
17:30	Poster Session and Wine Reception	

Tuesday 14 July

	Session 1: Fundamental Electrochemistry Continued Session Chair: John Irvine	
09:00	Proton uptake in the H⁺-SOFC cathode material Ba_{0.5}Sr_{0.5}Fe_{0.8}Zn_{0.2}O_{3-δ}: transition from hydration to hydrogenation with increasing oxygen partial pressure <u>Rotraut Merkle</u> , Daniel Poetzsch and Joachim Maier <i>Max Planck Institute for Solid State Research</i>	Paper 5979
09:05	Relating surface chemistry and oxygen surface exchange in LnBaCo₂O_{5-δ} air electrodes <u>Helena Téllez</u> , John Druce, John Kilner and Tatsumi Ishihara <i>International Institute for Carbon Neutral Energy Research (wpi-I2CNER)</i>	Paper 6154
09:10	Electrochemistry of La_{0.3}Sr_{0.7}Fe_{0.7}Cr_{0.3}O_{3-δ} as an oxygen and fuel electrode for RSOFCs <u>Viola Briss</u> , Beatriz Molero-Sánchez, Paul Addo, Aligul Buyukaksoy and Scott Paulson <i>University of Calgary</i>	Paper 6422
09:15	Discussion	
10:30	Morning Tea	
	Session 2: Materials Development Continued Session Chair: John Varcoe	
11.00	Improved electrochemical stability at the surface of La_{0.8}Sr_{0.2}CoO₃ achieved by surface chemical modification <u>Bilge Yildiz</u> , Nikolai Tsvetkov and Qiyang Lu <i>Massachusetts Institute of Technology</i>	Paper 5981
11.05	Oxygen exchange and transport in dual phase ceramic composite electrodes <u>John Druce</u> , Helena Téllez, Tatsumi Ishihara and John Kilner <i>Kyushu University</i>	Paper 6137
11.10	Calcium manganite as oxygen electrode materials for reversible solid oxide fuel cell <u>Chengsheng Ni</u> and John Irvine <i>University of St Andrews</i>	Paper 6124
11:15	Discussion	
12:30	Lunch	
	Session 3: System studies Session Chair: Tatsumi Ishihara	
13:30	A techno-economic model of a solid oxide electrolysis system <u>Joseph Hartvigsen</u> , Daniel Milobar and S. Elangovan	Paper 5976

	<i>Ceramatec, Inc.</i>	
13:35	Syngas production by high temperature steam/CO₂ coelectrolysis using solid oxide electrolysis cells Jian-Qiang Wang, <u>Xinbing Chen</u> , Chengzhi Guan, Guoping Xiao and Xianlong Du <i>Shanghai Institute of Applied Physics, Chinese Academy of Sciences</i>	Paper 5998
13:40	Synthesis of ammonia directly from wet air using Sm_{0.6}Ba_{0.4}Fe_{0.8}Cu_{0.2}O_{3-δ} as the catalyst <u>Shanwen Tao</u> , Rong Lan, Khaled Alkhazmi and Ibrahim Amar <i>University of Strathclyde</i>	Paper 6519
13:45	Discussion	
15:00	Afternoon Tea	
	Session 4: Understanding durability Session Chair: John Vohs	
16:00	Degradation of (La_{0.8}Sr_{0.2})_{0.98}MnO_{3-δ}-Zr_{0.84}Y_{0.16}O_{2-γ} composite electrodes during reversing current operation Scott Barnett, Gareth Hughes, Justin Railsback, Kyle Yakal-Kremksi and Danielle Butts <i>Northwestern University</i>	Paper 5974
16:05	Evaluation of oxide ceramics as anodes for SOECs <u>Andreas Egger</u> , Nina Schrödl and Werner Sitte <i>Montanuniversitaet Leoben</i>	Paper 6028
16:10	Discussion	
17:00	Close of sessions	
19:00	Pre-Dinner Drinks	
19:30	Conference Dinner	

Wednesday 15 July

	Session 4: Understanding durability Continued Session Chair: San Ping Jiang	
09:00	Understanding the processes governing performance and durability of solid oxide electrolysis cells <u>Sune Ebbesen</u> , Xiufu Sun and Mogens Mogensen <i>Technical University of Denmark</i>	Paper 5975
09:05	Synthesis of mesoporous nanocomposites for their application in solid oxide electrolysis cells: microstructural and electrochemical characterization <u>Marc Torrell</u> , Laura Almar, Alex Morata and Albert Tarancón <i>Catalonia Institute for Energy Research (IREC)</i>	Paper 6132
09:10	Discussion	
10:00	Morning Tea	
	Session 5: Oxygen Electrodes Session Chair: Scott Barnett	
10:30	Chromium deposition and poisoning of La_{0.8}Sr_{0.2}MnO₃ oxygen electrodes of solid oxide electrolysis cells <u>San Ping Jiang</u> , Kongfa Chen, Junji Hyodo, Aaron Dodd, Na Ai, Tatsumi Ishihara and Li Jian <i>Curtin University</i>	Paper 5977
10:35	Electrochemical stability of Sm_{0.5}Sr_{0.5}CoO_{3-δ}-infiltrated YSZ for solid oxide fuel cells/electrolysis cells	Paper 6153

	<u>Minfang Han</u> and Hui Fan <i>Tsinghua University</i>	
10:40	Electrode kinetics of the NiO porous electrode for oxygen production in the molten carbonate electrolysis cell (MCEC) <u>Lan Hu</u> , Göran Lindbergh and Carina Lagergren <i>KTH Royal Insititute of Technology</i>	Paper 6136
10:45	Discussion	
	Session Chair: John Irvine	
12:00	Concluding remarks lecture <u>Andreas Zuttel</u> <i>Empa</i>	Paper 6520
12:30	Acknowledgements	
12:45	Close of meeting	

Presenting authors are indicated in the programme by an underline. The affiliation is for the presenting author. If the presenting author of your paper has changed since abstract selection please email events@rsc.org. Please note that this is a draft programme and timings may change.