Sustainable Energy Research and Development Centre

SENERES Newsletter

Issue no. 11/2014

Contents

Welcome address

Welcome to the eleventh issue of the SENERES Newsletter. SENERES is the project founded within frames of FP7 Capacities RegPot Programme. The main objective of the SENERES project is to reinforce and develop research and demonstration potential of the Institute of Power Engineering (Poland) and to set up the **Sustainable Energy Research and Development Centre SENERES** focused on high efficient low-carbon energy technologies: energy generation from biomass, clean coal technologies and fuel cells.

The SENERES Newsletter is a source of periodical information about SENERES project activities. It disseminates results of SENERES Centre research work and the Centre's development. It also delivers the most important information about the development of research, events and possibilities of research funding in SENERES thematic area.

SENERES Events

The 2nd of June 2014, Warsaw, Poland

On Monday, the 2nd of June 2014, the 3rd International Symposium on Solid Oxide Fuel Cells for Next Generation Power Plants: Gasifier - SOFC systems, took place. The event was organised in Radisson Blu Centrum Hotel at Grzybowska Street. It was the third symposium in SOFC subject organized sequentially in different countries (NL, UK).

This year it was held in Poland under SENERES project funded by the 7th Framework Programme and supported by the IEA - Advanced Fuel Cells Programme. The Symposium has been treated as the third SENERES Workshop within the frames of project realisation.

The Symposium was organised as a one day international event with multiple speakers (both scientists, industrial participants) from different organisations/institutions spread over different parts on the world. In addition to lectures, a poster session was also a part of the event.

The Symposium aimed at bringing together leading researchers and industry experts to discuss recent developments in SOFCs for next generation power plants with a focus on gasifier-SOFC systems.

The meeting was chaired by: dr P.V. Aravind (TU Delft) and dr Tomasz Golec (IEn). Symposium was attended by eminent specialists in the field of SOFC from all around the world: from Canada, Japan, United Kingdom, Italy, Germany, Netherlands and Poland.

Sustainable Energy Research and Development Centre SENERES
http://www.seneres.pl
Poland, 02-981 Warsaw, Augustówka 36, tel. : (22) 3451-451, fax: (22) 642 83 76
seneres@ien.com.pl

The third Symposium was inaugurated by Prof. Jacek Wańkowicz, the director of the Institute of Power Engineering (IEn). It was organised in collaboration between TU Delft, The Netherlands and Institute of Power Engineering (IEn), Poland and supported by IEA: Advanced Fuel Cells programme.

TU Delft Energy Technology

Research at the TU Delft Energy Technology section covers a broad variety of subjects including gas turbines, combustion, biomass gasification and Solid Oxide Fuel Cells (SOFC). Power plant research is aimed at more efficient and sustainable systems. Research and education focus on the design and modeling of thermal energy conversion systems. Experimental as well as modeling approaches are combined for obtaining in depth understanding of the system performance.

The Fuel Cells Laboratory in the Institute of Power Engineering provides research, development and deployment works in the area of clean, high-efficient, multi-fuel power generation technologies. The Laboratory is focused on the development of Solid Oxide Fuel Cells (SOFC) technology, ceramic membranes for oxygen separation, Direct Carbon Fuel Cells (DCFC) technology and ancillary equipment of the electricity and heat cogeneration systems (μ-CHP). The Laboratory realizes a number of national and international R&D projects in the field of SOFC technology. It provides also various expert analysis in the above area.

The research work in TU Delft in the area of fuel cells within SENERES project is focused on the investigation of Solid Oxide Fuel Cells (SOFC). It covers testing of new materials, layers spreading, inter-connectors and stoppers.

Evaluation of SOFC electrochemical properties and performance optimization is provided. Advanced experience in construction and testing of SOFC – anode supported cells (ASC). A number of pilot laboratory units for SOFC testing was projected and realized. New laboratory stands for single cells and short SOFC piles (2,5 KW) testing are in construction. The research group has the knowledge in technologies of production of SOFC thin layers by wet methods: film founding, silk-screen print, ink-printing, impregnation by paste, sol-gel, evaluation of SOFC microstructure and electrochemical properties.

Symposium Speakers

Among the invited speakers there were some prominent representatives of research and industry fields working in the area of Solid Oxide Fuel Cells for Next Generation Power Plants.

Prof. Nigel Brandon (Imperial College, UK)

Prof Nigel Brandon OBE FREng is Director of the Sustainable Gas Institute at Imperial College London, and Director of the SUPERGEN Hydrogen and Fuel Cells Hub. His research interests are focused onto electrochemical devices for energy applications, and in particular fuel cells. He was a founder of the fuel cell company Ceres Power.

Dr Marcin Siedlecki (IEn, Poland)

Dr Marcin Siedlecki is working at the Institute of Power Engineering. Until mid-2012 he has been working at Delft University of Technology in the Netherlands, where he obtained both his MSc and PhD degrees.

Sustainable Energy Research and Development Centre SENERES
http://www.seneres.pl
Poland, 02-981 Warsaw, Augustówka 36, tel. : (22) 3451-451, fax: (22) 642 83 76
seneres@ien.com.pl

Currently his work is focused on small-scale gasification of biomass and waste for CHP applications, including process optimization, development of on-line measurement methods and control systems.

Dr. P. V. Aravind (TU Delft, The Netherlands)

Dr. P.V. Aravind is Assistant. Professor at Section Energy Technology, Mechanical Engineering, Delft University of Technology. He is leading a research group on Fuel Cell Systems and Thermodynamics of Energy Conversion Systems at Delft and is involved in teaching courses in these areas.

Dr. Dave Ghosh (XRG EnergyTech Solutions Inc., Canada)

Dave Ghosh is President of XRG Energytech Solutions Inc., a recently formed company in Vancouver, Canada, dedicated to help companies commercialize clean energy and advanced materials technologies and products in practical industrial situations. He recently retired as Director, Science & Technology, NRC Institute for Fuel Cell Innovation. He was the Vice President and Chief Technology Officer (CTO) for Calgary-based public company Global Thermoelectric Inc. (presently Versa Power Systems) where he helped turn the company into one of the world's leading developer of Solid Oxide Fuel Cell Systems.

Dr. Massimo Santarelli (Technical University of Turin, Italy)

Dr Massimo Santarelli is Associate Professor in Thermodynamics and Heat Transfer, Department of Energy at Politecnico di Torino, Italy. His main research activity is linked to the topic of electrochemical systems applied to energy (fuel cells, electrolysers), power-to-chemicals (hydrogen, synthetic natural has, …), and their integration with renewable sources. He is the Coordinator of SOFC/SOEC section of the High-Quality Laboratory (LAQ) IN.TE.S.E. (Technology Innovation for Energy Sustainability) at Politecnico di Torino: SOFC and SOEC single cells and short stacks; high pressure PEM electrolysis.

Prof. Harumi Yokokawa (University of Tokyo, Japan)

Prof. Harumi Yokokawa has been involved for about 25 years in the investigation on SOFC materials from thermodynamic point of view. He has moved to the University of Tokyo after retirement from AIST, and currently serves as the project leader of the NEDO degradation project.

Mr Hiroyuki Ozawa (Mitsubishi Hitachi Power Systems Ltd., Japan)

Mr Hiroyuki Ozawa is the Deputy Manager, Development Design Group, Fuel Cell Business Department at Mitsubishi Hitachi Power Systems Ltd in Japan. He obtained his Bachelor of Engineering from University of Tokyo, Japan in 1993 and Professional Engineer JP (Mechanical Engineering) in March,2010. He joined MHI in 1993 involved with plant engineering (thermal power plant and chemical plant). From October 2002, he is engaged in fuel cell development work (SOFC and PEMFC).

Sustainable Energy Research and Development Centre SENERES
http://www.seneres.pl
Poland, 02-981 Warsaw, Augustówka 36, tel. : (22) 3451-451, fax: (22) 642 83 76
seneres@ien.com.pl

List of presentations

Prof. Nigel Brandon (Imperial College, UK): Developments in Solid Oxide Fuel Cells

Dr Marcin Siedlecki (IEn, Poland): Distributed energy production via gasification of biomass and waste

Prof. Dave Ghosh (XRG EnergyTech Solutions Inc., Canada): Importance of Gas Clean-up Unit for Integration of SOFC to Bio Energy Systems

Dr PV Aravind (TU Delft, The Netherlands): Gasifier-SOFC systems

Dr Oliver Posdziech (Sunfire, Germany): SOFCs for gasifier integration

Prof. Massimo Santarelli (Technical University of Turin, Italy): SOFC system fed by biogenous fuels with CO2 capture and reutilization: a proof-of-concept experience

Prof. Harumi Yokokawa (University of Tokyo, Japan): Recent activities in Japan on SOFC stack/system development

Dr Jakub Kupecki (IEn, Poland): Performance of SOFC stack fuelled by syngas from biomass gasifier

Prof. Bartłomiej Głowacki (Cambridge University, UK): Recent Developments in Direct Carbon Fuel Cells

Mr Hiroyuki Ozawa(Mitsubishi Hitachi Power Systems, Ltd., Japan): Recent Development of SOFC-GT system in MHPS

Aditya Thallam Thattai (TU Delft): Lessons learned from the 250 MW IGCC in The Netherlands

Sustainable Energy Research and Development Centre SENERES
http://www.seneres.pl
Poland, 02-981 Warsaw, Augustówka 36, tel. : (22) 3451-451, fax: (22) 642 83 76
seneres@ien.com.pl