SAEST Newsletter

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Fifteenth National Convention of Electrochemists - A Report

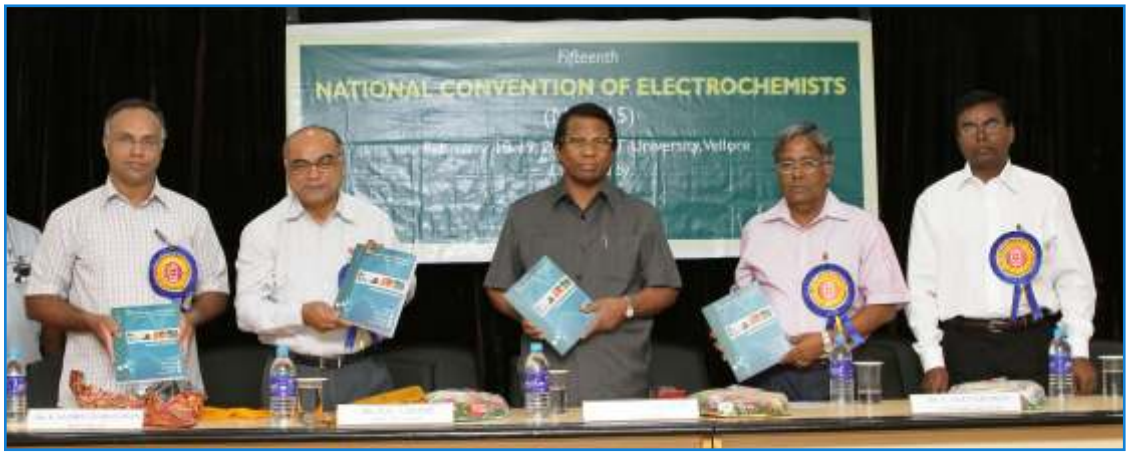
The Society for Advancement of Electrochemical Science and Technology (SAEST) in collaboration with Central Electrochemical Research Institute, Karaikudi and VIT University, Vellore organized the Fifteenth National Convention of Electrochemists (NCE-15) and was held at VIT University, Vellore during February 18-19, 2010

Dr. V. Yegnaraman, Acting Director, CECRI, Karaikudi presided over the inaugural function. Welcoming the guests Dr. K. Sathiyanarayanan, Director, SAS, VIT University, Vellore laid emphasis on the theme of the convention. Dr. G. Viswanathan, Chancellor, VIT University, Vellore inaugurated the convention by lighting the lamp and delivered the inaugural address. Dr. P.K. Ghosh, Director, CSMCRI, Bhavnagar released the book of abstracts and souvenir of NCE-15. Dr. G. Sozhan, Secretary, SAEST proposed vote of thanks.

The convention began with the Prof. K.S.G. Doss Memorial Lecture on "Electrochemical processes related to water and energy: recent work at CSMCRI' by Dr. P.K. Ghosh, Director, CSMCRI, Bhavnagar. Dr. V. Yegnaraman, Acting Director, CECRI gave a brief introduction about the prestigious Doss Memorial Lecture.

240 delegates from academia, industries and R&D institutions across the country participated. The convention was illuminated by delivering invited lectures by eminent foreign scientists Dr. Florence Epron, University of Poitiers, France and Dr. M. Decker, Kurt-Schwabe-Institute for Mess and Sensortechnik, Germany. Besides, two more enlightening invited lectures delivered by the eminent scientists Dr. S. Maruthamuthu, CECRI, Karaikudi and Dr. D. Subhakar, VIT University, Vellore.

Dr. G. Viswanathan, Chancellor, VIT University, Vellore inaugurating the convention



Dr. P.K. Gosh, Director, CSMCRI releasing the souvenir and book of abstracts of NCE-15

A section of delegates during the Convention

Additionally, the convention witnessed presentation of 162 research papers both in the oral and poster sessions. The convention provided evidence with 30 papers presented by research scholars in an exclusive scholar session.

The valedictory and prize distribution ceremony of NCE-15 was held on February 19, 2010. The function began with the welcome address by Dr. G. Sozhan, Secretary, SAEST. Dr. S. Vasudevan, Treasurer, SAEST read out the names of the award winners from various categories. Dr. D.P. Kothari, Vice-Chancellor, VIT University, Vellore presented the awards for the best papers in oral presentations from different areas judged by peers. Dr. V. Yegnaraman, Acting Director, CECRI, Karaikudi presented the awards for the best papers presented in the poster session and Dr. K. Sathiyanarayanan, Director, SAS, VIT University, Vellore presented awards for the best oral presentations in the scholar session.

The 'Best Electroplater Award' instituted by the Metal Finishers' Association of India, and governed by the SAEST is being traditionally presented at the NCE every year. Mr. S. Gunasekaran, Joint-Secretary, SAEST briefed about the award and announced the winners. For the year 2005 and 2006, the award conferred to Dr P Veeramani, and Dr S Mohan, Scientists, CECRI, Karaikudi respectively. Dr. V. Yegnaraman, Acting Director, CECRI, Karaikudi presented the award which consists of a medal with cash prize and citation to the winners. The program concluded with vote of thanks proposed by Dr. A. Senthil Kumar, Professor, SAS, VIT University, Vellore and Convener, Local Organising Committee.

Apart from CSIR, financial support was obtained from several private firms to the convention, notably M/s. Alfa Aecer Ltd.

Study of a Water Electrolysis System using a Compact Solar Cell Module with a Plant Shoot Configuration

Shin'ya OBARA*

*Power Engineering Laboratory, Department of Electrical and Electronic Engineering
Kitami Institute of Technology, 165 Koen-cho, Kitami, Hokkaido 090-8507, Japan
E-mail: obara@mail.kitami-it.ac.jp

In the proposed system, all of the power of a house is supplied with a small fuel cell using the hydrogen obtained from water electrolysis by photovoltaic power. Figure 1 shows an energy supply system with a fuel cell, a photovoltaics and a water electrolyzer. A flat solar cell module requires a wide installation area. However, because it is difficult to obtain a wide area near a house or apartment in an urban area, installation of the solar cell is limited. Therefore, this study considers installation of a solar cell module with a plant shoot configuration (similar to the stalk, stem of a leaf, and leaf on a plant). Hydrogen and oxygen formed by water electrolysis are stored in each cylinder. Generally, the light that reaches a plant leaf is separated into a reflective component, an absorption component to the chloroplast, and a transmission component [1, 2]. A plant will not see its branches and leaves increase when in a low position, virtually inaccessible to sunlight. This configuration is remarkable as the individual in a stock [3]. Furthermore, the photosynthetic ability and respiration rate of leaves reached easily by sunlight increase. The received light characteristics of a plant shoot have been studied by morphological botany [4, 5]. However, there are a few examples that investigate the received light characteristics of the plant shoot configuration using numerical simulation. Therefore, we developed a simulation algorithm concerning optimization of the received light characteristics of a plant shoot [6-8]. We clarified the relationship between the received light characteristics and the plant shoot configuration, such as

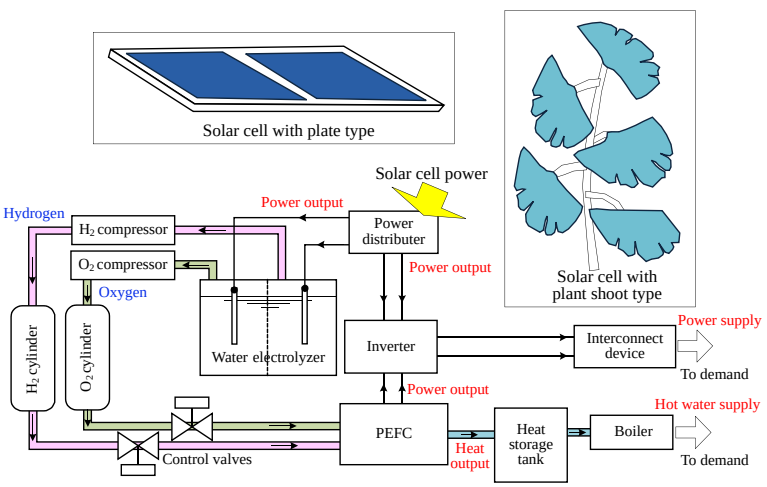


Fig. 1 Proposed energy system

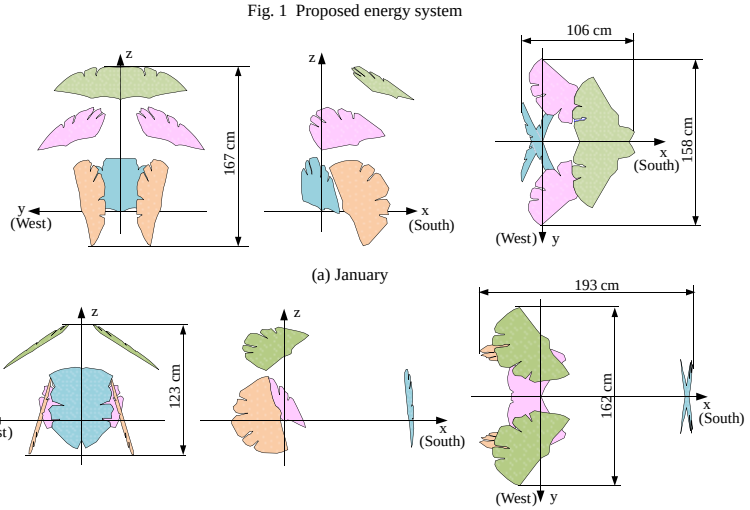


Fig. 2 Arrangement results in January of the plant shoot model of ginkgo biloba

that of a ginkgo biloba, using this simulation program [6-8]. From these research findings, it is thought that a solar cell module with a plant shoot configuration of lobed leaves, such as that of ginkgo biloba, reduces the installation area greatly compared to that of a conventional flat solar cell module. Figure 2 shows the optimal configuration of the solar cell module with the plant shoot configuration. The size of the leaf was fixed in these simulations. Moreover, the combination of the length of a branch of a leaf is also fixed. When changing these values, a smaller module arrangement is obtained.

The objectives of this study are to introduce a solar cell module with the shoot configuration of ginkgo biloba into an individual house and to develop an independent electrical power system via utilization of solar energy. If the proposed system is confirmed according to the results of this study, a house with an independent green energy source is possible.

References

[1] M. Chelle, Ecol. Model. 198 (2006) 219-228.
[2] S. Lenk and C. Buschmann, J. Plant Physiol. 163 (2006) 1273-1283.
[3] A. Takenaka, J. Plant Res. 107 (1994) 321-330.
[4] The Society for the Study of Species Biology, Figures of Light, Water, and a Plant-Guide to Plant Physiological Ecology, Bun-ichi Sogo Shyuppan, Tokyo, Japan; 2003 (In Japanese)
[5] T. Hirose, M.J.A. Werger, T.L. Pons, and J.W.A. Rheenen, Oecologia (1988) 77.
[6] S. Obara, J. Thermal Sci. Tech. 4 (2009) 272-283.
[7] S. Obara. J. Thermal Sci. Tech. 4 (2009) 41-52.
[8] S. Obara. Renew. Energ. 34 (2009) 1210-1226.

Shin'ya Obara

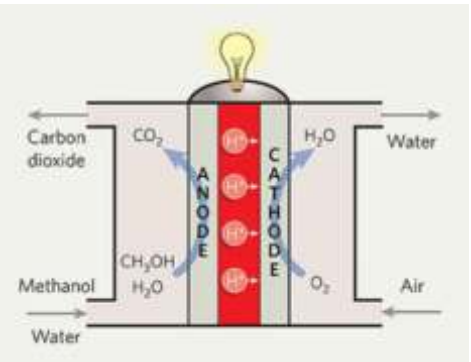
Science News

Portable power supply takes a step forward

Chinese scientists have developed membranes that could improve direct methanol fuel cells (DMFCs).

DMFCs oxidise methanol to produce small amounts of electricity over long periods, making them ideal as portable power supplies. A vital component of DMFCs is the membrane, which separates the two reactions of the cell while allowing protons to move between them. But sometimes unreacted methanol can also pass through the membrane, which reduces the fuel efficiency and performance. 'This methanol cross-over is an Achilles' heel for the implementation of the DMFC,' says Yohannes Kiros, an expert in fuel cells and energy at the Royal Institute of Technology, Stockholm, Sweden.

Protons can cross the improved membrane but methanol cannot Lei Li of Shanghai Jiaotang University has tackled this problem by modifying commonly-used perfluorosulfonic acid membranes. In these membranes, the polar sulfonic acid groups gather into clusters forming channels through which transport occurs. 'It is well known that the transport properties of the membranes are directly affected by the [density of sulfonic acid groups],' says Li.



Protons can cross the improved membrane but methanol cannot

By varying this density, Li was able to find a membrane whose selectivity properties exceed those of current, commercially available ones. 'Compared with Nafion® 117 membranes, our membrane has a similar proton conductivity but the methanol permeability is about 80% less,' he says.

This work dwells on one of the most important aspects of dealing with the methanol cross-over in DMFC,' says Kiros. However, he also notes that other factors such as operating conditions, methanol concentration and acid equilibration need to be investigated.

Li acknowledges this need for further data: 'We are continuing to work on these membranes to improve their performance. Testing of our membranes in real DMFCs and optimization of the membrane formation process are now underway in our lab,' he says.

Philip Robinson
Sourec: *Chemical Technology* Volume 1, 2010

Minimising carbon dioxide emissions

An integrated process to generate energy from methane combustion without producing waste carbon dioxide has been proposed by UK scientists.

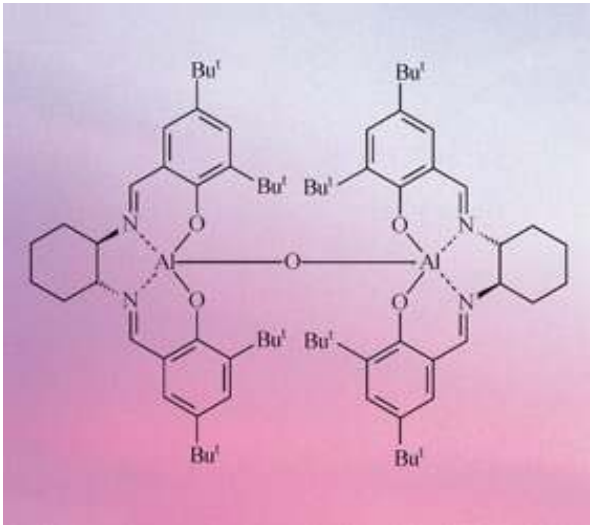
With climate change an ever-present threat, reducing CO_2 emissions is critical. But increasing energy demands mean the solution isn't as simple as cutting fossil fuel combustion. Michael North and his team at the University of Newcastle say that it could be possible to maintain the energy production and immediately convert the waste CO_2 into useful chemicals avoiding the costs associated with carbon capture and storage.

North's system uses a membrane to separate and feed pure oxygen to the fuel allowing clean combustion, eliminating any NO_x production. The waste CO_2 is then fed into a reaction mixture with an epoxide and a catalyst producing cyclic carbonates. Cyclic carbonates have many applications including degreasing agents, electrolytes and solvents.

Although reusing waste CO_2 is to make cyclic carbonates is not a new idea, previous proposals involve using a catalyst that needs temperatures above 150 °C and high pressures which requires more energy to be put in. North previously developed an aluminium complex with a tetrabutylammonium bromide as a cocatalyst that catalyses the reaction at temperatures in the range of 20-100 °C, compatible with waste heat from the power plant.

A tetrabutylammonium catalyst allows coversion of carbon dioxide under mild conditions 'The beauty of this system is that you're not making a new C-H or C-C bond, so the reaction is exothermic,' says North.

Nilay Shah, a chemical engineering expert at Imperial College London, UK, is impressed by the system. 'It's about the creativity of looking for the best molecules to make from CO_2 is , so that you can start to make really high volume molecules,' he says.



A tetrabutylammonium catalyst allows coversion of carbon dioxide under mild conditions

North demonstrated the process on a laboratory scale but says he is confident it could be made into a continuous flow process for a commercial system. He also plans to further investigate the catalyst's tolerance towards water and other impurities.

Yuandi Li
Source: *Chemical Technology* Vol.2 (2010)
06 January 2010

Conference Alert

XII International Symposium on Polymer Electrolytes (ISPE-12)
29 August - 3 September, 2010
Padova, Italy.
Website: http://www.chimica.unipd.it/ispe12/

5th Asian Conference on Electrochemical Power Sources (ACEPS)
September 17- 20, 2010
National University of Singapore, Singapore
Website: http://www.aceps-5.org/

Eight International Symposium on Electrochemical Micro & Nanosystem Technologies
September 21-24, 2010, Nice, France.
Website: http://www.enscp.fr/EMNT2010/

9th International Frumkin Symposium "Electrochemical Technologies and Materials for 21st Century"
October 24-29, 2010 - Moscow, Russia.
Website: http://phyche.ac.ru/frumkinsymp/

LIFE FELLOW MEMBERS
Dr. G.S. Suresh, S.S.M.R.V. Degree College, Bangalore
Mr. S. Pattabhi Raman, M/s. Coimbatore Integrated Waste Management Company, Coimbatore
Dr. G. Sozhan, CECRI, Karaikudi (change of category)

LIFE ACTIVE MEMBERS
Mr. A. Senthil Kumar, Vikram Sarabhai Space Centre, Trivandrum (change of category)
Dr. S. Ravichandran, CECRI, Karaikudi
Dr. S. Senthil Kumar, CECRI, Karaikudi
Mr. A. Santhanam M/s. Arson Chemicals Corporation, Tirupur
Dr. N. Lakshminarasimhan, CECRI, Karaikudi
Dr. K.S. Nagaraja, Loyola College, Chennai
Mr. D. Arumugam, Alagappa University, Karaikudi.

ACTIVE MEMBER
Dr. K.S. Beena Kumari, Kerala Water Authority, Thiruvananthapuram

STUDENT MEMBER
Ms. A. Vijayalakshmi, Research Scholar, Mettur Dam

Awards & Honours

Best Electroplater Award - 2005

Conferred to Dr. P. Veeramani, Scientist, CECRI, Karaikudi at the NCE-15, VIT University, Vellore

Best Electroplater Award - 2006

Conferred to Dr. S. Mohan, Scientist, CECRI, Karaikudi at the NCE-15, VIT University, Vellore .

Best Paper Awards - NCE-15

GOLD MEDAL WINNERS

Ms. P. Swetha, VIT University, Vellore
Ms. M. Helan, CECRI, Karaikudi
Ms. Susmita Singh, Bengal Eng. Sci. Univ., Shibpur

SILVER MEDAL WINNERS

Mr. Ch. Jagadeeswara Rao, IGCAR, Kalpakkam
Ms. Beena Sarawathyamma, Cochin Univ. Sci. Tech., Kochi
Mr. S. Vinod Selvaganesh, CECRI Madras Unit, Chennai
Ms. Adeeba F. Khan, Visvesvaraya Natl. Inst. Tech., Nagpur
Mr. R. Senthil Kumar, CECRI, Karaikudi
Ms. A. Sakunthala, Bharathiar University, Coimbatore
Ms. AN. Nagammai, CFE, CECRI, Karaikudi
Mr. G. Prabaharan, M/s. Rubamin Limited, Halol
Mr. P. Naga Praveena Sharma, CECRI, Karaikudi
Ms. J. Lakshmi, CECRI, Karaikudi
Ms. G. Velvizhi, IICT, Hyderabad
Ms. S. Sornambikai, VIT University, Vellore

iSAEST-9

9th International Symposium on Advances in Electrochemical Science and Technology

December 2–4, 2010 | Hotel Green Park, Chennai, India

Venue: Hotel Green Park, Chennai

Organised by

Society for Advancement of Electrochemical Science and Technology
Karaikudi

Central Electrochemical Research Institute
(Council of Scientific & Industrial Research)
Karaikudi

Technical papers in session topics and in allied aspects will be considered for presentation at the Symposium in oral/poster sessions.

Call for papers on the following areas

Code	Area
[A]	Basic Electrochemistry and Electroanalysis
[B]	Electrochemical Power Systems
[C]	New Materials in Electrochemical Systems
[D]	Corrosion Science and Materials Protection
[E]	Electroplating and Surface Engineering
[F]	Bioelectrochemistry and Biotechnology
[G]	Electrochemical Sensors and Devices / Instrumentation
[H]	Nanoscale Electrochemistry
[I]	Environmental Electrochemistry
[J]	Electrosynthesis & Electrometallurgy / Industrial Electrochemical Processes
[K]	Hydrogen - Electrochem. Production, Storage & Applications
[S]	Code for scholar session, irrespective of the area

Delegates registration

	Overseas (US $)	India (Rs.)
Delegate	300	6000
SAEST Life Fellow/ Life Active Member	-	5000
Accompanying spouse	150	2500
Student researcher	150	3000
Company registration (for 3 delegates)	750	15000

Please register on or before **July 31, 2010**. The registration fee has to be paid by a demand draft drawn in favour of "SAEST, KARAIKUDI", India payable at KARAIKUDI. The registration fee, once paid, will not be refunded but could be adjusted for another delegate from the same organization and/or towards abstracts and proceedings. Registration fee includes three lunch and two dinner.

Those desirous of contributing papers to the Symposium are requested to send abstracts of the papers (maximum 250 words, two figures and one table) in electronic version to <saestkkd@yahoo.com> and a hard copy on an A4 size paper along with the duly filled-in pre-registration form. The abstract should include objectives of the study, results and tentative conclusions. Please indicate the session name on the abstract and your choice for oral or poster presentation. However, the committee reserves the right to reassign presentations as deemed appropriate. The name of the authors, the presenting author, their affiliations, addresses, fax, e-mail, mobile numbers and other details should be mentioned.

SYMPOSIUM PROGRAMME

Dates	: December 02–04, 2010
Venue	: Hotel Green Park, Chennai, Tamil Nadu, India.
Language	: English
Technical Programme	: Keynote lecture(s), Invited lectures, oral and poster sessions, scholar session and Commercial exhibition
Social events	: Pre-conference meet, cultural programme and local sight-seeing
Souvenir	: A souvenir along with a book of abstracts will be released

IMPORTANT DATES

Deadline for abstracts with Pre-registration form	: July 31, 2010
Notification to author(s)	: August 30, 2010
Final Announcement	: October 25, 2010

For further details, please log on to www.saest.com

SYMPOSIUM SECRETARIAT

The Secretary
Society for Advancement of Electrochemical Science and Technology (SAEST)
CECRI Campus, Karaikudi 630 006, Tamil Nadu, INDIA.
Tel : +91 4565 224198 / 227550 to 227559 Fax : +91 4565 227713 / 227779
E-mail: saestkkd@yahoo.com Website: www.saest.com