

WORKSHOP – ENERGY, Cod. WE13

TITLE:

**ADVANCED MATERIALS FOR ALTERNATIVE ENERGY TECHNOLOGIES.
HYDROGEN BASED ENERGY – IS THAT A VIABLE SOLUTION FOR INCLUDING IN ROMANIAN
ENERGY STRATEGY DURING 2007-2020?**

SCIENTIFIC REPORT

1. Scientific content

Objectives

The event proposes to consult some representative personalities in order to establish potential research and investigation directions in alternative energy technologies domain and also future strategic directions and priorities for Romanian R&D system. The expected result is to introduce those priorities in Romanian energy strategy project for 2007-2020.

The main objective of the event was to promote scientific collaboration between scientists all over the world, that have different professional expertise and aims in order to strength the relations for participating in international projects. The theme of the event was to debate new tendencies in an actual field: alternative energy technologies.

Also one of the event's objectives was to inform the public and national authorities on the economic potential and implementation of hydrogen based energy systems in order to modify the social attitude over them. Also, the workshop proposed to largely inform the expertise and national interest regarding clean alternative energy field in order to sustain new innovative researches in such domain. The main idea was to promote the development of strong institutional networks as excellence poles and competence both national and international level.

Presented themes

The presented themes were various regarding national level rules in national energy strategy and also research and implementation of new renewable energy sources. Also the themes regarding materials used in renewable energy systems were various.

There were presented 18 themes structured in different fields as:

1. Romanian energy strategy.
2. New tendencies in hydrogen – National research center for Hydrogen and Fuel Cells
3. Wind energy development scenarios.
4. Photovoltaic used in buildings.
5. Actual Stage and research views over renewable alternative energy technologies in Ukraine.
6. Food matrix information.
7. Materials research in general activity in Nuclear Research European Organization (CERN).
8. Physico-chemical characterization of Perfluoridecarbons used as cooling fluids in LHC/CERN – I. Characterization methods.
9. Physico-chemical characterization of Perfluoridecarbons used as cooling fluids in LHC/CERN – I. Ionized radiation effect.
10. Electrochemical technologies for “Hydrogen Economy”. Actual and future researches in fuel cells at Newcastle University UK.
11. New development in material modeling for hydrogen storage.
12. Carbonic materials for hydrogen storage.
“Hydrogen economy” - Actual and future researches in Spain.

13. Thermal management and energetic optimizing: challenge and success in advanced microelectronic cooling systems.
14. Metallic cover using chemical reduction without electric energy usage for electrocathlysis in fuel cells. Actual and future reseaches in Greece.
15. Actual and future reseaches in INCDIE ICPE-CA in the domain of hydrogen storage and fuel cells.
16. Hydrogen and fuel cells activity in Birmingham University & new development regarding SOFC.
17. Recent investments made by UK Gouvernment in “Hydrogen Economy” and fuel cells.
18. New scientific partnership in order to assure knowledge transfer and project participation.

Contribution on the development of future scientific directions

In energetic European strategy it is clear that there are three major issues that must be solved: climat change, energetic safety, industrial competitiveness and economy growth. Development and implementation of hydrogen technologies may have a significant plus in order to achieve European objectives regarding energetic security, air quality, and environment pollution. Based on this, innovative technologies development as fuel cells technology and also hydrogen technology became crucial.

Clean energy research based on hydrogen is a top research field and the development of power sources is led by Japan and USA. For exemple in 2006, Japan’s budget for hydrojen and fuel cells project was in mount of 270 mil. Euro. The UE’s budget for the same field was in 2007 almost 237 mil. Euro, distributed in different calls: FP7-ENERGY-2007-1-RTD aprox.109.3 milion Euro si FP7-ENERGY-2007-1-TREN aprox. 128 milion Euro.

The event brought together potential partners from different Universities, R&D centers both Romania and Europe. They had a combined expertise field as: physics, chemistry, material science, engineering, electrotechnic and energy. So the R&D competitiveness will grow by stimulating strategic partnership in witch the researchers will contribute at the development of new products.

Conclusions/Obtained results

The science shown that there are two alternaties in durable assurance of energy: renewable sources (vind, photovoltaic, etc) and fuel cells, or hydrogen based energy that will have a complementary role in energy needs assurance. In that way, the major potential in satisfying energy needs is given by the hydrogen intesivelly produced in industry with multi-terrawat energetic capacities. By promoting hydrogen energy surces as clean technologies for stationary applications in social communities, industrial and commercial communities, the research field in this domain will be helpful in clean and durable energetic systems development.

In Romania here is an urgent need for components and young researchers specialized in some critical domains that can lead such a complicated research project. Without this, there will be an imminent danger to import energy in order to assure Romania’s needs.

Following the discussions regarding interest and situation in national level on renewable energy sources it was be prposed that in **National Energetic Strategy 2007-2020** the **energetic systems based on hydrogen** must be included as prioritary domain.

2. Informații privind organizarea evenimentului

Autoritatea Nationala pentru Cercetare Stiintifica si Academia Romana, sub inaltul patronaj al Primului Ministru al Romaniei a organizat Conferinta *"Diaspora in Cercetarea Stiintifica Romaneasca"*, in perioada 17 - 19 Septembrie 2008, in Bucuresti. Din cele 21 workshop-uri exploratorii organizate, WE13 **“Materiale avansate pentru tehnologii energetice alternative. energia bazata pe hidrogen - solutie viabila pentru includerea in proiectul de strategie**

energetica a romaniei pe perioada 2007–2020?” a fost organizat de catre autoritatile sus mentionate si in colaborare cu INCDIE ICPE-CA Bucuresti. Workshop-ul Exploratoriu WE13 s-a desfasurat in intervalul 17 – 18 septembrie 2008.

Tematica workshop-ului a vizat dezbaterea noilor tendinte intr-un domeniu de mare actualitate: *tehnologii energetice alternative*, incurajand colaborarile stiintifice dintre oamenii de stiinta din diferite tari ale lumii, cu preocupari si experiente profesionale variate, in vederea intaririi si promovarii participarii comune la proiectele internationale.

Locatia aleasa pentru desfasurarea manifestarii a fost **Rin Grand Hotel**, asigurand un inalt nivel de calitate din punct de vedere organizatoric, impus unei astfel de manifestari stiintifice.

La eveniment au fost invitati sa participe 35 specialisti, din care: 5 lectori invitati din diaspora, 8 lectori invitati din Romania, 6 lectori invitati din strainatate, ceilalti 14 participand in calitate de specialisti in domeniu. In afara listei participantilor inregistrati, alti 2 tineri doctoranzi au fost invitati de INCDIE ICPE-CA sa participe la eveniment.

Lista participantilor la Workshop-ul Exploratoriu – ENERGIE - WE13

Nr.	Nume	Prenume	Institutie	Tara
1	ARDELEAN	MARIAN	S.C. ECOFERMA SRL	Romania
2	BALA	Constantin	UPB, Facultatea de Inginerie Electrica / INCDIE ICPE-CA	Romania
3	BALA	Camelia	Universitatea din Bucuresti, Facultatea de Chimie	Romania
4	CHIRIAC	Victor Adrian	Technology Solutions Organization, Freescale Semiconductor (formerly MOTOROLA SPS)	USA
5	CHIRIAC	Florea	Universitatea Tehnica de Constructii din Bucuresti	Romania
6	CHITANU	Gabrielle Charlotte	Institutul de Chimie Macromoleculara Petru Poni	Romania
7	CIOPRAGA	Mircea	Camera Deputatilor, Comisia pentru Industarii si Servicii	Romania
8	CISTELECAN	Mihail Vasile	ICPE-Institutul de Cercetare pentru Masini Electrice (ICPE-ME)	Romania
9	COMOROSAN	Sorin	Academia Romana	Romania
10	CUCIUREANU	Dumitru	Q-SRL	Romania
11	CULCER	Mihai	Institutul National de Cercetare-Dezvoltare pentru Tehnologii Criogenice si Izotopice - ICSI Rm. Valcea	Romania
12	ENESCU	Elena	INCDIE ICPE-CA	Romania
13	ILIE	Sorin	European Organization for Nuclear Research (CERN)	Elvetia
14	ILIE	Diana	European Organization for Nuclear Research (CERN)	Elvetia
15	IORDACHE	Iulian	INCDIE ICPE-CA	Romania
16	LAZAROIU	Gheorghe	Universitatea Politehnica Bucuresti	Romania
17	MENCINICOPSCI	Gheorghe	Institutul de Cercetari Alimentare, Bucuresti	Romania

18	MIREA VASILESCU	Radu	INC DIE ICPE-CA	Romania
19	OLARIU	Nicolae	Universitatea Valahia din Targoviste	Romania
20	PIRVULESCU	Viorica	Institutul de Chimie Fizica	Romania
21	PLUGARU	Neculai	Instituto de Ciencia de Materiales de Aragón, CSIC	Spania
22	RIMBU	Gimi A.	INC DIE ICPE-CA	Romania
23	SETNESCU	Radu	European Organization for Nuclear Research (CERN)	Elvetia
24	STAMATIN	Ioan	Universitatea Bucuresti	Romania
25	STANCIU	Vasile	Institutul National de Cercetare-Dezvoltare pentru Tehnologii Criogenice si Izotopice - ICSI Rm.Valcea	Romania
26	TANTAREANU	Cristian	Centrul pentru Promovarea Energiei Curate si Eficiente in Romania, ENERO	Romania
27	TAPOSU	Iosif	INAV S.A. Institutul de Aviatie	Romania
28	SCOTT	Keith	Newcastle University	UK
29	BUJALSKI,	Waldemar	University of Birmingham	UK
30	POLLET	Bruno	University of Birmingham	UK
31	KOKKINIDIS	Giorgios	Aristotle University of Thessaloniki	Grecia
32	ARENILLAS	Ana	Instituto Nacional del Carbón, INCAR-CSIC	Spania
33	BARSUKOV	Viacheslav	Kiev National University of Technologies & Design	Ukraina

PROGRAMUL WORKSHOP-ULUI

17/09/2008 - Chair: Dr. Elena ENESCU / **Co-Chair:** Prof.dr. Neculai PLUGARU

09:00 – 09:30 Inregistrare

09:30 – 09:45 **Dr. Elena ENESCU**

Dr. Gimi A. RIMBU

Cuvant de deschidere

09:45 – 10:15 **Dep. Mircea CIOPRAGA**

Strategia Energetica Romaneasca.

10:15 - 10:45 **Vasile STANCIU**

Tendintele Dezvoltarii Domeniului Hidrogenului – Centrul National de cercetare pentru Hidrogen si Pile cu Combustibili.

10:45 – 11:15 **Dr. Cristian TANTAREANU**

Scenarii de Dezvoltare a Energiei Eoliene in Romania.

11:15 – 11:45 **Pauza Cafea**

11:45 – 12:15 **Prof. Nicolae OLARIU**

Utilizarea Sistemelor Fotovoltaice in Cladiri.

12:15 – 12:45 **Prof. Gheorghe LAZAROIU / Prof. Viacheslav BARSUKOV**

Stadiul Actual si Perspectivele Cercetarii asupra Tehnologiilor Energetice Alternative si Regenerabile in Ukraina.

12:45 – 13:15 **Prof. Gheorghe MENCINICOPSCI**

Informatia matricei alimentare.

13:15 – 15:00 **Pauza Masa**

15:00 – 15:30 **Dr. Sorin ILIE**

Cercetarea Materialelor in Contextul Activitatii Generale din Organizatia Europeana de Cercetari Nucleare (CERN).

15:30 – 16:00 **Dr. Diana ILIE**

Caracterizarea Fizico-Chimica a Unor Perflurocarboni Utilizati ca Fluide de Racire in LHC / CERN – (I). Metode Fizico-Chimice de Caracterizare.

16:00 – 16:30 **Dr. Radu SETNESCU**

Caracterizarea Fizico-Chimica a Unor Perflurocarboni Utilizati ca Fluide de Racire in LHC / CERN – (II). Efectul Radiatiilor Ionizante.

16:30 – 16:45 **Pauza Cafea**

16:45 – 17:00 **Discutii**

18/09/2008 - Chair: Dr. Elena ENESCU / **Co-Chair:** Prof.dr. Neculai PLUGARU

09:15 – 09:45 Inregistrare

09:45 – 10:15 **Dr. Gimi A. RIMBU / Prof. Keith SCOTT**

Tehnologii Electrochimice pentru “Economia Hidrogenului”. Stadiul Actual si Perspectivele Cercetarii in Domeniul Pilelor de Combustie la Universitatea din Newcastle, UK.

10:15 – 10:45 **Prof. Neculai PLUGARU**

Dezvoltari Recente in Modelarea Materialelor pentru Stocarea Hidrogenului.

10:45 -11:15 **Prof. Ioan STAMATIN / Dr. Ana ARENILLAS**

Materiale Carbonice pentru Stocarea Hidrogenului.

“Economia Hidrogenului” - Situatia actuala si Perspectivele Cercetarii in Spania.

11:15 – 11:45 **Pauza Cafea**

11:45 – 12:15 **Dr. Victor CHIRIAC**

Optimizarea Energetica si Managementul Termic: Succes si Provocare in Racirea Sistemelor Microelectronice Avansate.

12:15 – 12:45 **Dr. Viorica PIRVULESCU / Prof. Georgios KOKKINIDIS**

Acoperiri metalice prin reducere chimica, fara a utiliza energia electrica, pentru electrocataliza reactiilor in pilele cu combustibil. Stadiul Actual si Perspectivele Cercetarii asupra Tehnologiilor Energetice Alternative si Regenerabile in Grecia.

12:45 – 13:15 **Dr. Gimi A. RIMBU**

Stadiul Actual si Perspectivele Cercetarii la INCDIE ICPE-CA, in Domeniul Materialelor pentru Stocarea Hidrogenului si Tehnologiei Pilelor cu Combustibili.

13:15 – 15:00 **Pauza Masa**

15:00 – 15:30 **Dr. Bruno POLLET**

Activitatea in Domeniul Hidrogenului si Pilelor cu Combustibili la Universitatea din Birmingham (UoB) & Dezvoltari Recente in Tehnologia SOFC la UoB.

15:30 – 16:00 **Dr. Waldemar Bujalski**

Investitii Recente ale Guvernului UK in Domeniul “Economiei Hidrogenului” si Tehnologiei Pilelor cu Combustibili.

16:00 – 16:30 **Masa Rotunda**

Identificarea posibilitatilor de dezvoltare a unor parteneriate stiintifice, in scopul schimbului de experienta si transferului de cunostinte, precum si participarea in proiecte comune de cercetare.

16:30 – 16:45 **Pauza Cafea**

16:45 – 17:00 **Dr. Elena ENESCU**

Cuvant de incheiere

3. Lista finală lectori invitați (keyspeakers) – titlul științific, nume, prenume, semnatura, țara de origine, instituția de la care provin, adresa, telefon, fax, email, scurtă prezentare a experienței profesionale

Dr. Victor Adrian CHIRIAC, Technology Solutions Organization, Freescale Semiconductor (formerly MOTOROLA SPS), 2100 East Elliot Road, Phoenix, Arizona 85284, United States of

America, Phone: (480)413-6756, Fax: (480)413-4511, Email: victor.chiriac@freescale.com / vchiriac@cox.net

Experienta profesionala: *Managementul termic al microelectroniceilor*

Dr. Diana ILIE, European Organization for Nuclear Research (CERN), CH-1211 Geneva 23, Switzerland, e-mail: diana.ilie2007@yahoo.com

Experienta profesionala: *fluide si sisteme de racire pentru detectoarele de particule cu energie ridicata si acceleratorul de particule LHC.*

Dr. Sorin ILIE, European Organization for Nuclear Research (CERN), CH-1211 Geneva 23, Switzerland, e-mail: sorin.ilie@cern.ch

Experienta profesionala: *fluide si sisteme de racire pentru detectoarele de particule cu energie ridicata si acceleratorul de particule LHC.*

Prof. Neculai PLUGARU, Departamentul pentru Stiinta si Tehnologia Materialelor si Fluidelor, Centrul Politehnic Superior, Universitatea din Zaragoza, Spania, Edificio Torres Quevedo, C.P.S., c/ María de Luna 3, 50018 Zaragoza, tel. +34 976 762524, e-mail: plug@unizar.es

Experienta profesionala: *Aliaje metalice si materiale magnetice pentru aplicatii in dispozitive magneto-electronice, nano si spin-tronice; stocare hidrogen; modelare matematica*

Dr. Radu SETNESCU, European Organization for Nuclear Research (CERN), CH-1211 Geneva 23, Switzerland, e-mail: radu.setnescu@cern.ch

Experienta profesionala: *Compusi perfluorocarboni utilizati ca fluide de racire in LHC-CERN*

Deputat Mircea CIOPRAGA, Vicepresedinte al Comisiei pentru Industrii și Servicii a Camerei Deputaților / Presedinte al Delegatiei Romane la Adunarea Parlamentara de Cooperare Economica la nivelul Marii Negre (A.P.C.E.M.N.), e-mail: mciopruga@cdep.ro

Dr.ing. Cristian TANTAREANU, Centrul pentru Promovarea Energiei Curate si Eficiente in Romania, ENERO, Str. Feroviarilor nr.51, ap.13, et.3, Tel./Fax: 021 6652605; E-mail: c.tantareanu@enero.ro

Experienta profesionala: *Eficienta energetica, Surse noi si regenerabile de energie*

Prof.dr.ing. Nicolae OLARIU, Universitatea "Valahia" Târgoviste Departamentul de Cercetare Energie Mediu, Bd. Carol I, Nr. 2, 0200, Targoviste, Dambovita, ROMANIA, Tel. +40/245/206101, Fax. +40/245/217692, E-mail: olariu@valahia.ro

Experienta profesionala: *Eficienta energetica, Surse noi si regenerabile de energie*

Prof.dr. Gheorghe MENCINICOPACHI, Institutul de Cercetari Alimentare, Bucuresti, str. Garlei, nr. 1, tel. 230 50 90, e-mail: menci@ccai-ro.com

Experienta profesionala: *biocombustibili, bioindustrii, biotehno-logie alimentara*

Dr.ing. Vasile STANCIU, Institutul National de Cercetare-Dezvoltare pentru Tehnologii Criogenice si Izotopice - ICSI Rm.Valcea, Strada Uzinei nr.4, Cod:240050, Telefon: 0250/732744, Fax: 0250/732746, e-mail: vstanciu@icsi.ro

Experienta profesionala: *Surse noi si regenerabile de energie, hidrogen si pile de combustie*

Prof.dr. Ioan STAMATIN, Universitatea Bucuresti, Centrul de Cercetare 3NanoSAE, B-dul Mihail Kogalniceanu nr. 34-46, Tel/Fax: 021 4574838, E-mail: istarom@3nanosae.unibuc.ro

Experienta profesionala: *Surse noi si regenerabile de energie, hidrogen si pile de combustie*

Prof.dr.ing. Gheorghe LAZAROIU, Universitatea Politehnica Bucuresti, Splaiul Independentei nr.313, Bucuresti, Sector 6, Tel 021 4029868, E-mail: glazaroiu@yahoo.com

Experienta profesionala: *Surse noi si regenerabile de energie, hidrogen si pile de combustie*

Dr.ing. Gimi A. RIMBU, INCDIE ICPE-CA, Splaiul Unirii 313, 030138, Bucuresti, Sectorul 3, Tel. 021 3468297, Fax 021 3468299, Email: rimbu@icpe-ca.ro
Experienta profesionala: *Surse noi si regenerabile de energie, hidrogen si pile de combustie*

Dr.ing. Viorica PIRVULESCU, Institutul de Chimie Fizica "I.G. Murgulescu", Splaiul Independenței nr.202, București, Sector 6, Telefon 224.88.95, Fax. 312.11.47, E-mail: vpirvulescu@icf.ro
Experienta profesionala: *cataliza, hidrogen si pile de combustie*

Prof. Keith SCOTT, University of Newcastle, Chemical Engineering and Advanced Materials (CEAM) Dept., Newcastle upon Tyne, UK, E-mail: k.scott@ncl.ac.uk
Experienta profesionala: *Electrochimie, electrocataliza, hidrogen si pile de combustie*
Activitati desfasurate / Rezultate: *Coordonator proiecte FP7 in domeniul tehnologiei pilelor de combustie.*

Prof. Waldemar BUJALSKI, University of Birmingham, School of Chemical Engineering, Edgbaston Birmingham, B15 2TT, UK, E-mail: w.bujalski@bham.ac.uk
Experienta profesionala: *Electrochimie, electrocataliza, hidrogen si pile de combustie*
Activitati desfasurate / Rezultate: *Coordonator proiecte FP7 in domeniul tehnologiei pilelor de combustie.*

Dr. Bruno POLLET, University of Birmingham, School of Chemical Engineering, Edgbaston Birmingham, B15 2TT, UK, E-mail: b.g.pollet@bham.ac.uk
Experienta profesionala: *Electrochimie, electrocataliza, hidrogen si pile de combustie*
Activitati desfasurate / Rezultate: *Participant proiecte FP7 si EPSRC in domeniul tehnologiei pilelor de combustie.*

Dr. Giorgios KOKKINIDIS, Aristotle University of Thessaloniki, Chemistry Department, Thessaloniki 54124, Greece, Tel.++302310997751, Fax ++302310997709, E-mail: kokkinid@chem.auth.gr
Experienta profesionala: *Electrochimie, electrocataliza, hidrogen si pile de combustie*
Activitati desfasurate / Rezultate: *Participant in proiecte FP7 in domeniul catalizei si tehnologiei pilelor de combustie.*

Dr. Ana ARENILLAS, Instituto Nacional del Carbon, Departamento de Tecnologia Energetica y Medioambiental, Oviedo, Apartado 73, 33080 Oviedo, Spain, E-mail: aapunte@incar.csic.es
Experienta profesionala: *Stocare hidrogen si pile de combustie*
Activitati desfasurate / Rezultate: *Coordonator proiecte FP7 in domeniul tehnologiei pilelor de combustie.*

Prof. Viacheslav BARSUKOV, Kiev National University of Technologies & Design, Department for Electrochemical Power Engineering & Chemistry, 2 Nemirovich - Danchenko str., Kiev 02011, Ukraine, Tel +380 44 284 8266, Fax + 380 44 280 0512, E-mail: chemi@mail.vtv.kiev.ua
Experienta profesionala: *Electrochimie, electrocataliza, sisteme de stocare, baterii Li-ion*
Activitati desfasurate / Rezultate: *Participant in proiecte FP7 in domeniul catalizei si tehnologiei pilelor de combustie.*

4. Informații statistice privind participanții (structura pe vârste, distribuție geografică etc)

Structura pe varste:

20 – 35 ani: 3 persoane
35 – 50 ani: 17 persoane

50 – 65 ani: 13 persoane
> 65 ani: 2 persoane

Distributia geografica:

Romania: 24 persoane
USA: 1 persoana
Spania: 2 persoane
Elvetia: 3 persoane
UK: 3 persoane
Grecia: 1 persoana
Ukraina: 1 persoana

5. Materiale prezentate la workshop, pagina web a evenimentului (print), afiş, poze, orice alte materiale oferite la eveniment (se vor prezenta la raport pe CD)



Director General,
Prof.dr. Wilhelm KAPPEL

Director Project,
Dr.ing. Gimi A. RIMBU