National Hydrogen Association

NEWSLETTER

June 2023 E- Newsletter:15

NATIONAL HYDROGEN ASSOCIATION 2023 AWARDS

NEJAT VEZİROĞLU SPECIAL AWARD 2023:

Prof. Dr. Saim Özkar

Prof. Dr. Saim Özkar investigated photolytic reactions of metal-carbonyl compounds with olefines and synthesized many new organometallics as part of his PhD thesis, which was completed in 1976 at the Technical University of Munich, Germany. He continued his research on the development of organometallic compounds as catalysts, especially for the photolytic hydrogenation or hydrosilylation of alkenes and alkynes at the Department of Chemistry, Middle East Technical University. He worked on the confinement of organometallic molecules within the highly ordered pores of zeolites for the purpose of converting them to new types of nanomaterials with unique chemical and physical properties at University of Toronto, Canada. However, he couldn't continue such research in Turkey, because of missing advanced analytical instruments. Instead, he investigated the reaction kinetics of organometallic compounds and this research project has been supported by Volkswagen Foundation, Germany. Later, when the advanced analytical facilities were available at the METU Central Laboratory, he started to work on the synthesis and formation mechanism of transition metal nanoparticles and then, on the development of metal nanoparticles as effective catalysts for the hydrogenation and dehydrogenation reactions. He could achieve significant enhancement in the catalytic activity and stability of transition metal nanoparticles. Hence, he could obtain highly active and long lived nanocatalysts for many industrially important hydrogenation-dehydrogenation reactions.

Prof. Dr. Saim Özkar has noticed the big threat of global warming at the beginning of new millennium and decided to do research in the hydrogen related area. In all the seminars and conferences, given by him as a member of Turkish Academy of Sciences at various universities, he has emphasized the vital role of hydrogen as a green energy carrier in transition from fossil fuels to the renewable energy sources on the way towards a sustainable energy future and the importance of using boron compounds as hydrogen storage materials because Turkey possesses 74% of the World boron reserves. He discovered where to make contribution to the field by his research abilities and started with the development of catalysts for releasing hydrogen from the hydrolysis of sodium borohydride. His 2005 paper in the Journal of Alloys and Compounds was the first example of using transition metal nanoparticles as catalyst for releasing hydrogen from the hydrolysis of sodium borohydride. This paper demonstrated that the colloidal ruthenium nanoparticles has much higher catalytic activity than the bulk counterparts in the hydrolysis of sodium borohydride. Using his accumulated knowledge and experience on the organometallics and transition metal nanoparticles, Saim Özkar could shortly develop highly active nanocatalysts for this hydrolytic reaction. Due to his achievements in developing many highly active nanocatalysts for hydrogen generation from the hydrolysis sodium borohydride, Saim Özkar was invited to the European Union Project NESSHY (Novel Efficient Solid Storage for Hydrogen) with participants from twelve countries. Although many highly active catalysts have been developed for the hydrolysis of sodium borohydride within the NESSHY project, a decision has been made to stop the research on using sodium borohydride as solid hydrogen storage materials because of unfeasible recovery of the hydrolysis by-product back to the sodium borohydride. Then, much attention has been focused on using ammonia borane as solid hydrogen storage materials. Saim Özkar has been one of the pioneering researchers developing nanocatalysts for hydrogen generation from the hydrolysis of ammonia borane. He developed many transition metal nanoparticles as highly active, long-lived and highly reusable nanocatalysts for hydrogen generation from the hydrolysis of ammonia borane. He achieved the preparation of nanocatalysts which provide turnover frequency values up to 4000 min-1, have lifetime yielding over a million turnovers and retain 100% of initial activity even after ten runs of hydrolysis of ammonia borane at room temperature. A WebofScience search for "hydrolysis of ammonia borane" shows that Saim Özkar is the author publishing the highest number of papers in the topic.

In addition to the hydrogen generation from the hydrolysis of sodium borohydride and ammonia borane, Saim Özkar has also made significant contributions to the international science and technology in the field of hydrogen energy by conducting research on the following hydrogen related areas: (i) Developing highly active rhodium nanocatalysts for hydrogen generation from the methanolysis of ammonia borane. (ii) Developing transition metal nanocatalysts for the release of hydrogen from other boron-nitrogen compounds such as dimethylamine borane and hydrazine borane. (iii) Developing transition metal nanocatalysts for dehydrogenation of formic acid which has been considered as one of the most promising liquid hydrogen storage materials. (iv) Developing transition metal nanocatalysts for hydrogenation of aromatic compounds at room temperature. (v) Using transition metal nanoparticles as electrocatalysts for hydrogen evolution from water splitting.

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NATIONAL HYDROGEN ASSOCIATION 2023 SERVICE AWARD:

Prof. Dr. Zeynep Sema Baykara

PROF. DR. ZEYNEP SEMA BAYKARA received the 2023 SERVICE AWARD from the National Hydrogen Association. We congratulate our esteemed professor, who is also an active member of our Association, and wish her continued success.

National Hydrogen Association's Service Award recipient Prof.Dr. Sema Z. Baykara was born in Istanbul. Graduating from high school in Uskudar American Academy, she continued her education in Bogazici University in Istanbul (BSc. Chem.Eng 1975), and University of Salford in Manchester, England (MSc. Chem. Eng, 1977). After working as a researcher in 'solar energy group' of Applied Physics Department of Marmara Research Center of TUBITAK, she continued research in solar hydrogen production in Mechanical Engineering Department of University of Montreal, Canada (PhD. Mech. Eng, 1987); and returned to MRC-TUBITAK as a senior researcher in Department of Mechanical Engineering and Energy. She joined Chemical Engineering Department of Yildiz Technical University in 1990 and stayed in academic life.

Her research projects and publications[*] are mainly on development of hydrogen production technologies and related materials involving reactor, processes, chemical plant, and solar thermal plant (solar furnace, central tower with heliostat field, parabolic receiver field) designs for hydrogen production from water, coal, boron compounds, hydrogen sulfide, methane, biomass gas via thermal and/or catalytic process.

* A sample publication: [(S.Z. Baykara, Hydrogen: A brief review on its sources, production and environmental impact, Int.J. Hydrogen Energy 2018; 43(23): 10605-10614) (2018 IJHE T.Nejat Veziroglu Award for authoring the most cited paper of the year 2018 in the Hydrogen Energy/ Hydrogen Economy Category)]

NATIONAL HYDROGEN ASSOCIATION 2023 TECHNOLOGY AWARD:

ASPİLSAN Enerji Sanayi ve Ticaret A.Ş adına Emre ATA'ya takdim edilmişltir.

ASPİLSAN Enerji Sanayi ve Ticaret A.Ş. was founded in Kayseri Organized Industrial Zone in 1981.

ASPİLSAN Enerji; like ASELSAN, ROKETSAN, Turkish Aerospace, HAVELSAN and İŞBİR Elektrik, is a company of Turkish Armed Forces Foundation (TAFF) and 98.32% of its shares are owned by TAFF.

ASPİLSAN Enerji started the production of radio batteries in 1985, and the production of aircraft and helicopter batteries in Ni-Cd chemistry in 1993. Until 1996, ASPİLSAN Enerji produced Ni-Cd rechargable cells with Varta license.

The main activities and solutions of ASPİLSAN Enerji are;

- INR18650 Lithium-Ion Rechargeable Cylindrical Battery Production
- Different Chemistry Cells' Sale
- Radio and Weapon Battery Systems
- Telecommunication Batteries
- Medical Battery Systems
- Mini ESS and Energy Storage Systems
- Aviation Battery Systems and Battery Batteries (Lithium-Ion and Nickel Cadmium)
- Marine Battery Systems
- Railway Battery Systems
- Robotics and Autonomous Battery Systems
- Engineering and Test Services
- Electronic Card Assembly

ASPİLSAN Enerji, the first and only company in Türkiye to produce aircraft/helicopter battery systems in Ni-Cd chemistry, is also the largest battery manufacturer in the country.

The four R&D centers are located in Kayseri, Ankara, and Istanbul. Battery Systems R&D Center in Kayseri; Electronic R&D Center in Ankara; Cell Design and Development R&D Center in Ankara; and Hydrogen & Fuel Cells R&D Center in Istanbul.

ASPİLSAN Enerji has started mass production of its Li-Ion Rechargable Cylindrical Cell ASPİLSAN INR18650A28 in June 2022 and it is the first company in Europe to conduct mass production of li-ion 18650 cells. The design, development and production of the cell is completely domestic and national. All intellectual and industrial property rights of the cell belong to ASPİLSAN Enerji.

The chemistry and composition of ASPİLSAN INR18650A28 is nickel-rich lithium-nickel-manganese-cobalt oxide. Its dimension is 18650; its capacity is 2800 mAh and its voltage is 3.6V. Compared to similar capacity cells of well-known certified brands, ASPİLSAN Enerji's lithium-ion 18650 cell has proved to have a higher discharge rate and the ability to function at lower temperatures. The annual production capacity of the lithium-ion cell production plant is 220 MWh. The production line is capable of producing 21,600,000 cells per year. The plant infrastructure and production line are not designed and constructed solely to produce cells in NMC chemistry but also 18650 and 21700 lithium ion cells in NCA, LFP, LCO, LMO and LTO chemistries.

The lithium-ion cells produced by ASPİLSAN Enerji can be used in radio systems, jammers, robotic and weapon systems, power tools, medical batteries, hybrid vehicles, smart textile product batteries, electronic bikes and scooters, forklifts, UPS systems, and energy storage systems. In addition to the existing product portfolio, ASPİLSAN Enerji designs and develops project-based products to meet customers' needs.

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Communication Association Coordinator: Fatma Taşçı / 0 533 726 72 55 / fatma.tasci@hidrojenteknolojileri.org
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At ASPİLSAN Enerji's Hydrogen and Fuel Cell R&D Center, PEM and Alkaline type electrolyzer and PEM type fuel cell development studies are carried out. This center was established in 2018 in the Teknopark Istanbul campus in Pendik, and a laboratory/workshop area started operating in 2020. National and international projects are carried out in the center, where prototype development studies are carried out at cell and directory level. The aim of this center is to become an electrolyzer supplier by completing small-scale commercial projects within 2 years, and to gain the ability to develop directories in Mega-Watt scale within 5 years.

NATIONAL HYDROGEN ASSOCIATION YOUNG SCIENTEST AWARD 2023:

Dr. Benedetto NASTASİ

Dr. Benedetto NASTASİ is an Assistant Professor in the Department of Planning Design Technology of Architecture, at Sapienza University of Rome, Italy. He has more than ten years of experience in research and teaching in Higher Education, Postdoc experience in four different Universities in Italy and The Netherlands participating in several EU-funded projects. Reviewer for Horizon Europe and National Funding Agencies of Kazakhstan, Italy, Poland, and Qatar. Ph.D. Summa Cum Laude in Energy Engineering and M.Eng. in Architectural and Building Engineering with Honours at the Sapienza University of Rome. He is World's Top 2% Scientist according to Stanford ranking in 2019, 2020, and 2021 in "Energy" and "Building & Construction". Editorial Board Member of Q1 Journals. Best Young Investigator in Building Science 2022 and awarded for scientific works in several Journals and Conferences. Scientific Qualification as Associate Professor in Building Physics & Building Energy Systems. Author of 100+ publications with 100+ co-authors from 15+ Countries.

NATIONAL HYDROGEN ASSOCIATION STUDENT RESEARCHER AWARD 2023:

Alper Can İNCE

I graduated from mechanical engineering department of Dokuz Eylul University in 2017. I joined Dr. Colpan's group to study in thermodynamic program for master's degree at the same university. Under supervision by Dr. Colpan, I studied on process modeling and simulation of fuel cells, electrolyzers and their system integration with renewable energy resources. I got accepted by Julich Forshungzentrum which is one of the prestigious institutions of Germany to study experimental part of my studies under supervision by Dr. Martin Mueller and Dr. Andreas Glusen. I joined the mechanical engineering department of Gebze Technical University as research assistant from the priority area (Fuel Cell and Hydrogen) in 2018. Here, I conducted research on meso-scale heat and mass transport phenomena in fuel cell and electrolyzer with Dr. Fazil Serincan. As a result of these studies, my nine research articles listed in SCI or SCI-Expanded were published in a high-impact journals. Moreover, I presented my researches in national and international conferences and two book chapters were published in international academic presses. After three years as a research assistant, I was accepted to University of Connecticut to conduct my PhD. I currently continue working on my PhD under supervision by Dr. Ugur Pasaogullari. As a part of my PhD project duty, I have currently conducted research under supervision by Dr. Jacob Spendelow at Los Alamos National Lab which is one of the highest prestigious laboratories of the USA. Here, we have fabricated and tested for carbon-free nano-structured electrodes for fuel cells. Moreover, we have manufactured various electrodes that provide faster proton transport using nano-structured electrodes. We believe that these studies will be potential solutions for some important engineering problems in fuel cell applications, such as hydrogen starvation and high sheet resistance. As a result of these studies, I have been awarded to 'Student researcher award' given by National Hydrogen Association. I would like to thank the National Hydrogen Technologies Association for this award, which will be a great source of motivation for my works. I would also like to thank my family, my girlfriend Meltem, friends, and valuable teachers for their unwavering support.

NATIONAL HYDROGEN ASSOCIATION STUDENT RESEARCHER AWARD 2023:

Ali ALTUNTEPE

Niğde Ömer Halisdemir University Central Research Laboratory (Mechanical Engineer).

Ali ALTUNTEPE completed his undergraduate education at Niğde Ömer Halisdemir University, Department of Mechanical Engineering in 2017 and completed his master's degree at the same university on two-dimensional materials synthesis and energy applications. He continues his doctoral education at Niğde Ömer Halisdemir University under the supervision of Prof. Dr. Recep ZAN and Prof. Dr. Selahattin ÇELİK. Within the scope of his doctoral education, he is carrying out studies to determine the hydrogen storage potential of two-dimensional materials, metal hydrides, and their compositions.

Altuntepe has worked on graphene, two-dimensional materials, hydrogen storage, silicon-based solar cells, and PEM fuel cells throughout his career. In this context, he has publications in internationally indexed journals, book chapters, and numerous conference and seminar presentations.

Altuntepe was supported by a TÜBİTAK project titled "Determination of Hydrogen Storage Potential of Two Dimensional Materials and Compositions". He also received BİDEB 2211-C priority areas scholarship support in this field. He has also been awarded in various business idea competitions and project markets.

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HYDROGEN NEWS FROM TURKIYE 2023

Pilot production of green hydrogen started in the hydrogen valley

Pilot production of green hydrogen obtained from renewable resources has started within the scope of the "South Marmara Hydrogen Coast Valley Project", where Turkey's first hydrogen valley will be implemented. The green hydrogen of Turkey's first hydrogen valley started to be produced as a pilot at Enerjisa Üretim's Bandırma Energy Base and started to be used in the generator cooling of the facility.

More

Can Turkey be a green hydrogen supplier for Germany?

Within the scope of the International Hydrogen Development Program (H2-Uppp) Project, the representatives of the German Chambers of Commerce Abroad and the German International Cooperation Agency from the MENA region came together at the meeting, emphasizing Turkey's potential in the field of green hydrogen and its importance in the system.

More

SOCAR and Sabancı Develop a Hydrogen Project for Renewable Energy

SOCAR Turkey R&D and Innovation Center collaborates with Sabancı University to develop a hydrogen (H2) project, which is important for renewable energy.

More

Türkiye Hydrogen Technologies Strategy and Roadmap published

In the published roadmap, there is a target for the installed capacity of electrolyzer to reach 2 GW in 2030 and 5 GW in 2035. Hydrogen, which can be used in many different areas from transportation to industry, from renewable energy integration to green chemical production, offers an important alternative as an energy carrier in the use of fossil fuel-based energy sources with its high mass energy density of up to 120 MJ/kg and low environmental impact. Therefore, with the technology developed within the scope of combating climate change and the increasing energy demand, investments in hydrogen technologies are expected to increase further in the coming years. Hydrogen, which is seen as a complement to electrification-oriented development, is expected to make a great contribution to the industry sector's achievement of net zero emissions targets.

The Ministry of Energy and Natural Resources, which aims to create a carbon-zero economy model by using hydrogen in line with its 2053 net zero carbon emission targets, has prepared a "Turkey Hydrogen Technologies Strategy and Roadmap" to achieve this goal.

More

Signatures Signed on the "South Marmara Hydrogen Coastal Platform" Guided Project

The contract was signed on March 15, 2023 for the "South Marmara Hydrogen Coast Platform" Guided Project, with the grant support of the South Marmara Development Agency (GMKA), which carries out its activities under the coordination of the Ministry of Industry and Technology, General Directorate of Development Agencies and co-financed by Eti Maden and Enerjisa Üretim. .

With the "South Marmara Hydrogen Coast" Valley Project, a new and local contribution will be made to the Valley and the Hydrogen Economy of the Region, after 8 million EUR grant support, which was awarded within the scope of the Horizon European Framework Program...

The works to start from scratch to establish Turkey's first green industrial zone in the Southern Marmara and the creation of new industrial zones to obtain products with higher added value from the Boron mineral, which will become more important in the green transformation process, will further trigger the synergy in this area.

More

We have a chance to make the leap and become a leader in hydrogen production

President of the Hydrogen Technologies Association, Prof. Dr. İbrahim Dinçer said, "There is a leap forward in renewable energy, solar, wind, biomass, hydro and geothermal in our country. Türkiye has to make this leap for hydrogen as soon as possible. In order to turn this leap into added value in the energy economy, we need to produce hydrogen."

More

Electric vehicles that laugh first in automotive will be ‹green hydrogen› in the last laugh

The world is grappling with an unpredictable energy crisis, and unpredictable price increases in commodity prices are breaking supply chains. Of course, the automotive sector is among the sectors most affected by this situation.

More

The energy of the New Civilization is hydrogen

The use of hydrogen energy as a fuel in transportation vehicles is rapidly progressing. On January 18 this year, the first hydrogen train was launched in Chengdu, China. Japan has the second largest hydrogen refueling point in the world after China. South Korea is in third place. Most refueling stations are located in the Asia-Pacific region. These countries include Australia, New Zealand and India. In the US, there are only about 100 refueling locations. Germany is the only country in Europe with over 100 hydrogen stations. Many countries in Europe are developing strategies to promote the use of Hydrogen energy. The majority of hydrogen stations opening around the world are focused on refueling passenger cars with fuel cells. In addition, an increasing number of stations are opening for commercial vehicles, sea vehicles and train locomotives.

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Global hydrogen investments reach $1.1 billion

According to the information compiled from the "Renewable Energy Finance Global Outlook 2023" report of the International Renewable Energy Agency (IRENA), it is predicted that studies on hydrogen economy and technology will increase and the cost of green hydrogen production will decrease compared to alternative methods in this field.

More

Green hydrogen could be the savior of carbon-intensive industries

TÜBİTAK Marmara Research Center (MAM) President Advisor Prof. Dr. İskender Gökalp said that it is possible to produce hydrogen without emitting carbon dioxide using renewable energy sources and that the cement, ceramics and glass industry, which will be severely affected by the Green Deal sanctions, are the first sectors to benefit from the developments in this are'a.

More

They will strengthen the Turkish Century with green hydrogen

Carrying out important projects on "system changer" hydrogen, "clean fuel" and "combustion technologies" in the ENERGY market, Prof. Dr. İskender Gökalp continues his work, which he started in France, in Turkey. prof. Dr. Gökalp said, "We are developing systems that can burn hydrogen fuels in a safe, clean and efficient manner. We brought our work to a commercial dimension. Industry sectors will benefit from this," he said.

More

Türkiye's first hydrogen valley and first local green hydrogen plant are being established

According to the statement made by the Ministry of Industry and Technology, TÜBİTAK continues its search for solutions against climate change in a multifaceted way. Like the whole world, Türkiye is also turning to hydrogen. In this context, the "HYSouth Marmara Hydrogen Valley Project and the South Marmara Hydrogen Coast Platform Guided Project Signing Ceremony" will be pressed in two important projects. As part of the Southern Marmara Hydrogen Coastal Platform Guided Project, Turkey's first domestic green hydrogen facility with the largest capacity will be established at Bandırma Energy Base.

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7th International Hydrogen Technologies Congress IHTEC-2023

On 10-12 May 2023, the 7th International Hydrogen Technologies Congress (IHTEC-2023) was successfully held at Elazig Fırat University with the participation of over 200 scientists from Turkey and the world, and public stakeholders, especially TENMAK. Fırat University Rector, Mr. prof. Dr. Fahrettin Göktaş, Dean of the Faculty of Engineering, Mr. prof. Dr. Ebru Akpınar, Congress President Assoc. Dr. Mahmut Temel Özdemir, Vice President Prof. Dr. Muhsin Tunay Gençoğlu, Congress Technical President Prof. Dr. We would like to thank Mehmet Cebeci, Electrical and Electronics Engineering Department Management, Heads of Departments and Research Assistants for hosting us at the 50th anniversary events, and other university employees who contributed to the congress..

Hydrogen Technologies Association
Chairman of the Board
Prof. Dr. Ibrahim Dincer

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As the conference chairman of the 7th International Congress of Hydrogen Technologies (IHTEC 2023), I would like to state that we have crowned our activities by hosting a very important event in the last ring of the 50th anniversary of the Electrical and Electronics Engineering epartment, which I am proud to be a member of.

The congress, which was held between 10-12 May 2023, focused on hydrogen, which is a very strategic element and is seen as the fuel/energy carrier of the future by replacing fossil fuels; hydrogen economy, hydrogen infrastructures, hydrogen management, safety, production and transformation were realized with a focus on hydrogen.

The main subject of the congress is of great and critical importance for both our country and the world. Being aware of this importance, we started our preparations under the coordination of the Hydrogen Technologies Association under the presidency of Prof. Dr. İbrahim Dinçer. In order to reach more people related to hydrogen and its technologies, we updated our researcher database and reached around 38000 researchers from 108 different countries via the web page and 15000 researchers from 101 different countries via e-mail. As a result, 219 papers from researchers from 15 different countries came to our congress. Accepted papers were discussed simultaneously in 4 different halls over 3 days.

All sessions in the congress have been made suitable for physical-online interaction, both online and for physical participants, taking into account situations such as listening, commenting and evaluations, contributing to the desired session, and asking questions. Thus, 250 physical researchers and more than 600 online researchers were able to follow the congress.

Eleven scientists from different countries who are among the most influential scientists in the world on hydrogen energy, fuel cells, energy and clean energy; They participated as the opening, theme, general opinion and invited speakers of the congress. A special session was held on the Turkish Energy, Nuclear and Mining Research Institute (TENMAK), which has the role of conducting scientific research on energy in our country, coordinating, encouraging and supporting these researches. Detailed information is given about the R&D activities, hydrogen roadmap and Technology and Product Development Projects Support Program (TUGEP) of TENMAK, which has five Research Institutes.

In addition to the scientific program of the congress, a panel on "Challenges and Opportunities for the Region in the Hydrogen Economy" was held at the Elazig OIZ conference hall on May 11, 2023 at 16:45 for the industrialists of Elazığ's region. Under the moderation of Prof. Dr. İlhan Kocaarslan (Istanbul Technical University, ITU), the challenges and opportunities in hydrogen energy for Turkey and especially the Elazig region were discussed, and regulations and policies regarding hydrogen technologies were discussed. Adnan Midilli (ITU), Hasan Aksoy (SHURA), Emre Ata (Aspilsan), Tuğba Onur Dalgöğüsoğlu (TEK-SIS), İpek Harmanlı (TÜPRAŞ) and Ragıp Kızıltaş (TENMAK) spoke as panelists.

One of the first names that come to mind about hydrogen energy in the world is Prof. Dr. Turhan Nejat VEZİROĞLU is the permanent honorary president of the National Hydrogen Association. A total of five awards of 2023 by the Association were presented during the congress: Nejat VEZİROĞLU Special Award, Service Award, Technology Award, Young Researcher Award, and Student Researcher Award.

Turkey Energy, Nuclear and Mining Research Institution (TENMAK), chaired by Prof.Dr. Abdulkadir BALIKÇI, and GUMBEL Group, chaired by Mr. Mustafa HERDEM, were the main sponsors of the congress. ETİ KROM A.Ş. supported it as a gold sponsor. Elazig Municipality, Elazig OIZ and also ETSO and ATCE Energy President Mr. Taşkın ÖZEL supported our congress. We thank them all for their support.

Many visual and written news about our congress were published in local and national press, especially TRT and Anadolu Agency. With this aspect, much more people were reached apart from those who attended our congress.

Prof.Dr., Fahrettin GÖKTAŞ, Rector of Fırat University, provided all kinds of support for the realization of IHTEC2023 in our university. We would like to thank, Dean of Engineering Faculty Prof.Dr. Ebru AKPINAR, Head of Department Assoc. Prof. Dr. Mehmet ÖZDEMİR, all the academic and administrative staff of our department, our graduate students and everyone who contributed.

On behalf of the Organization Board
Congress President
Associate Professor Dr. Mahmut Temel ÖZDEMİR

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DEPARTMENT OF PHYSICS CUKUROVA UNIVERSITY HYDROGEN TECHNOLOGIES LABORATORY

On the 100th anniversary of the foundation of our Republic and the 50th anniversary of Çukurova University, a Hydrogen Technologies Laboratory was established with our renewable energy group within the Physics Department of the Faculty of Arts and Sciences. In order to train the young minds that our country will need on hydrogen technologies in the laboratory, scientific research is carried out at the graduate and doctoral levels, together with education at the undergraduate level. In addition, research and development studies are carried out on new technological products needed in hydrogen technologies within the scope of research and development studies.

Being a green hydrogen production center in our region is equivalent to having a say in the field of hydrogen technologies. Therefore, hydrogen technologies play a key role in the development of the hydrogen production sector.

In our laboratory, studies are carried out on PV, electricity generation and storage with PV-Ts, the development of electrolysis systems and equipment, and hydrogen storage systems. Among these, studies are carried out on chloralkali electrolysis system models and hydrogen compressors. Our working group consists of 12 members, including 1 honorary member who has never spared their support for us, 6 faculty members, 2 Doctors, and 3 Ph.D. students.

The most important issue in the production, storage, use, and transportation of green hydrogen is the development of hydrogen technologies. Because hydrogen technologies consist of many important pieces of equipment. The main goal of our team is to develop domestic and national technologies as much as possible in hydrogen technologies. Studies on chlor-alkali reactors are carried out in our laboratory. We continue to work on storage systems on small, medium, and large scales to store the produced hydrogen. In addition, carbon fiber and steel tubes, high-tonnage sealed tanks, and hydrogen storage methods are being investigated in underground geological environments (salt domes, aquifers, etc.) at 500,000-750,000 m3 and above on large scales. At the same time, our study on "Research of domestic and national hydrogen production and storage models for vehicles" continues within the scope of the RESEARCH UNIVERSITY SUPPORT PROGRAM (ADEP). June 04, 2023. Best regards,

Prof. Dr. Mehmet Karakılçık,
Çukurova University, Faculty of Arts and Sciences
Head of Physics Department

Honorary Member	Prof. Dr. İbrahim DİNÇER	Ontario Univ.
Director	Prof.Dr. Mehmet KARAKILÇIK	Çukurova Univ.
Researchers	Prof.Dr. İsmail BOZKURT	Adıyaman Univ.
	Assoc.Prof.Dr. Ayhan ATIZ	Çukurova Univ.
	Assoc.Prof.Dr. Hacı SOĞUKPINAR	Adıyaman Univ.
	Assist.Prof.Dr. Hatice KARAKILÇIK	Çukurova Univ.
	Assist.Prof.Dr. Serdal DAMARSEÇKİN	Şırnak Univ.
	Dr. Mustafa ERDEN	Çukurova Univ.
	Dr. Müzeyyen ÇİLOĞULLARI	Çukurova Univ.
	Ph.D. Student Sevinç UĞURATEŞ	Çukurova Univ.
	Ph.D. Student Gülay ŞATAK	Çukurova Univ.
	Ph.D. Student Yunus EmreTAŞKIN	Çukurova Univ.

Hydrogen Energy

Hydrogen energy, a pearl of the world
The future of humanity, the energy of the future
Like the sun rises, becomes the joy of life
The love of colorful flowers for you
The two components of water that make up the ocean
The energy of love that burns Juliet's heart
An indispensable ambassador of the most beautiful nature
How nice would it be with you, Every corner of the world

The story of bread, water, existence
Embroider the world, the energy of the stars
The universe's only proton, the first of the elements
Color is a trace of life, a past of the universe
Fairy of invisible power that works like a joker
The future is in the seas, the cleanest energy
It is filtered from the water, the two of the oxygen are separated
The future of humanity, green hydrogen energy

Prof. Dr. Mehmet Karakılçık
Written Date: July 1, 2022

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FUEL CELL ELECTRIC VEHICLES WORKING WITH HYDROGEN FOR THE TRANSPORTATION SECTOR

In the transition from the carbon age to the hydrogen age with the coronavirus disease 2019 pandemic; two main sectors have a major role to play in minimizing carbon emissions and climate change factor. One of them is the energy sector and the other is the transportation sector. According to August 2022 data, 24% of the world's carbon monoxide emissions are realized by the transportation sector. In other words, the percentages ratios of these vehicles are; 78% of them are land vehicles; 12% is by air vehicles, 8% by marine vehicles and 2% by railways.

Developing technology and necessities are also changing the face of the transportation sector; and this has led to the production of more user-oriented, more environmentally friendly and more efficient vehicles. Electric vehicles, which have been the shining star of the industry for the last 15 years, have increased their preferability due to their low emissions, quieter driving and less maintenance costs.

Following the Paris Climate Agreement and COP21, most automobile and vehicle manufacturers around the world allocate more time/resources to the use of alternative fuels and/or energy sources instead of petroleum. In particular, automotive producing countries stated that the production of fully electric and fuel cell vehicles is planned in their 2030-2040 schedule.

There are three main barriers; besides the advantages of electric vehicles, the first is low range, the second is the need for price optimization and good electricity grid infrastructure strategies, and the last one is that they cause emission generation indirectly, though not directly (most of the grid electricity is still obtained from power plants using fossil fuels).

Studies on the use of hydrogen in all transportation sectors are increasing in importance day by day. Hydrogen is a fuel element that is both more efficient and environmentally friendly since it has high combustable properties and does not contain carbon. Therefore, it can be used in both internal combustion engine processes and fuel cell electric vehicles.

In this report; how fuel cell electric vehicles are positioned in the worldwide transportation sector, their examples, importance, how they affect countries and the sector; analyzed for both environmental, technical and economically. In addition, this analysis was made for land, air and marine vehicles. At the end of the report, it is given as a prediction on which subjects can focus on for future studies.

It is our hope that our country will take its place in all sectors that will use fuel cell electric vehicles, including Turkey's car "Togg"; as soon as possible. We hope that the report will be useful to our country, the transportation sector and whom concerned.

Hüseyin Turan Arat, PhD, Assoc. Prof.

Mustafa Kaan Baltacıoğlu, PhD, Assoc. Prof.

Meryem Gizem Sürer, MSc.

Hydrogen Technologies Association General Assembly Election Meeting

Hydrogen Technologies Association General Assembly Election Meeting was held on May 22, 2023 in Yıldız Technical University, Davutpaşa Campus Annex Building Meeting Hall.

We wish our new Board members success in their duties.

- President: İBRAHİM DİNÇER
- Vice President: İNCİ EROĞLU
- Secretary General: CAN ÖZGÜR ÇOLPAN
- Treasurer: MEHMET KARAKILCIK
- PRIMARY MEMBER: AYSEL KANTÜRK FİGEN
- PRIMARY MEMBER: FİLİZ KARAOSMANOĞLU
- PRIMARY MEMBER: ADNAN MİDİLLİ
- PRIMARY MEMBER: BESTAMI OZKAYA
- PRIMARY MEMBER: RAMADAN SOLMAZ
- PRIMARY MEMBER: MAHMUT TEMEL OZDEMIR

OUR NEW CORPORATE MEMBERS

Solar Energy, one of the biggest renewable energy sources of the future and today, has come to the fore with land installations in Turkey since 2012, while the demand for industrial facilities started to rise with the regulation change made in 2018.

OzEnergy, headquartered in İzmir, has accomplished important projects on land and industrial roofs with its Professional staff since its founding. The Group also has a subsidiary headquartered in Hamburg, Germany where it manages its activities in Europe. It is also the sole authorized partner of Enerparc, the largest EPC company in Europe, in Turkey. OzEnergy group, which has made installations not only in Turkey but also in many regions of Europe, has been successfully continuing its path by taking part in more than 320 MWp projects in total since 2017.

OzEnergy experts manage the process for a solar power plant from scratch and guarantee correct engineering. All details are taken into consideration from the Project idea and realistic production estimates are presented to our investors.

What is the reason why solar energy, which has been on our agenda lately, has become so important recently?

- The European Union's target of reducing carbon emissions to 55% by 2030 and the Green Deal and border solar energy a necessity, not a target.
- One of the most important reasons for the acceleration of the demand for solar power plant investments in Turkey is the incentives applied.
- Regular hikes in electricity prices have also been accelerating.

As a result, thanks to solar energy, you can produce your electricity, reduce/reset your electricity bill, and contribute to a cleaner future. In this process, you can own your power plant, which you can use for many years with OzEnergy quality, with high efficiency and quality standards.

TOPKAPI ENDÜSTRİ Malları Ticaret A.Ş.

Founded in 1985, TOPKAPI INDUSTRY is an energy and engineering company. Headquartered in Istanbul, Turkey, TOPKAPI INDUSTRY operates in the fields of Energy Systems and Compression Systems.

Topkapı Industry provides engineering, sales, installation, maintenance and repair solutions to the sector with its 120 employees.

It has reached an installed capacity of 910 MWe with Jenbacher gas engines, which it has installed to its customers, first with natural gas and then with biogas. With the launch of gas engines that can burn 100% hydrogen at the beginning of 2022, it is getting ready for new projects.

With the use of hydrogen as a fuel, which we see as one of the most important factors in reducing the greenhouse effect, and especially with the EU's transition to the hydrogen economy, we aim to create value for our customers, employees, suppliers and society by working especially on renewable-based green energy production and gas separation systems.