

HAI Newsletter



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Editorial Committee

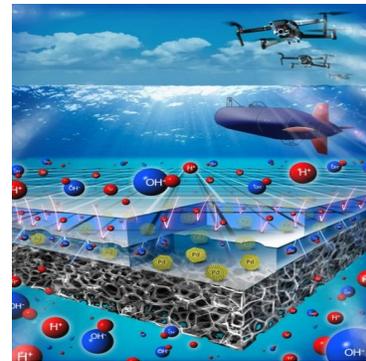
Alok Sharma

Sachin Chugh

High-powered fuel cell boosts electric-powered submersibles, drones

A team of engineers in the McKelvey School of Engineering at Washington University in St. Louis has developed a high-power fuel cell that advances technology in this area. This advancement using a unique pH-gradient-enabled microscale bipolar interface (PMBI), reported in *Nature Energy* Feb. 25, could power a variety of transportation modes - including unmanned underwater vehicles, drones and eventually electric aircraft -- at significantly lower cost. The fuel cell developed at Washington University uses an acidic electrolyte at one electrode and an alkaline electrolyte at the other electrode. Using membrane technology developed at the McKelvey Engineering School, the PMBI can keep the acid and alkali from mixing, forming a sharp pH gradient and enabling the successful operation of this system.

Ref: <https://www.sciencedaily.com/>



Research produce clean hydrogen fuel from seawater and electricity

Researchers from Stanford's School of Humanities and Sciences have developed a clean hydrogen fuel electrolysis production method that uses seawater and electricity. This new type of electrolysis can generate clean energy to power homes, cars and more, with only water vapor as the emission-free byproduct when burned. This new method is a breakthrough for hydrogen electrolysis (water-splitting) production because current electrolysis methods depend on highly purified water. Unlike saltwater, purified water is a precious resource and it is expensive to produce. The newly developed clean hydrogen fuel production system could also be used for

applications other than hydrogen. In addition to generating hydrogen, the system can create breathable oxygen. As such, the application could also be used for producing oxygen for breathing apparatuses or for submarines. While a normal electrolysis machine would typically last only 12 hours, their setup, which offsets the effects of corrosion and significantly improves the structures durability, could survive for more than 1,000 hours.



Quote:

" If you want to find the secrets of universe, think in terms of energy, frequency and vibration".

Nikola Tesla

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Innovative hydrogen fuel cell lab to be launched by Nikola Trucks

Nikola Motor Company has announced that it has placed a \$16 million equipment order for its new hydrogen fuel cell lab. The company believes that fuel cell trucks will replace diesel trucks in the next 10 years. The American-based startup headquartered out of Phoenix, Arizona, is a huge supporter of hydrogen fuel transportation and believes that its fuel cell tech will replace diesel for trucks in the next decade. Nikola's hydrogen fuel cell lab could help make this a reality. In addition to its hydrogen fuel cell lab, the company expects to begin building hydrogen-electric trucks by 2021. Nikola Motor recently purchased a 389-acre parcel in Arizona for its hydrogen-electric truck manufacturing plant, closing a \$23-million deal. The 1 million-square-foot plant will be located about 50 miles south of Phoenix and is expected to break ground in 2020. By 2021, Nikola anticipates it will begin building vehicles for fleet tests and move on to full commercial production by 2023.

Ref: <http://www.hydrogenfuelnews.com/>



China's Production of Hydrogen Fuel-Cell Vehicles grows 27% in 2018

According to a report by *OFweek Industry Research Center* China manufactured 1,619 hydrogen fuel-cell vehicles in 2018, which is up 27% from 2017. The company Zhongtong Bus' was ranked the top manufacturer of fuel cell vehicles in 2018 with a total of 790 fuel cell vehicles produced. On December 29, 2018, 20 fuel cell buses made by Yutong hit the road, marking a new upgrade of the public transport system in Henan province. Compared with electric city buses, the fuel cell city buses boast short hydrogen refueling time and longer driving range. Based on the current specification of the vehicle, it takes 10 minutes to fully refueling the hydrogen, and has a driving range of about 500 km. It is also reported that Yutong will continue to develop fuel cell vehicles, make breakthrough in terms of core technologies including fuel cell vehicles, fuel cell system and hydrogen system, establish a completed test evaluation system of fuel cells, and achieve the industrialized promotion of fuel cell buses.



Plug Power is introducing a new ProGen hydrogen fuel cell engine that can be used in on-road applications. The new hydrogen fuel cell engine is 30 kilowatts and can be used in delivery vans and cargo box trucks. According to Plug Power, the higher capacity of its ProGen 30-kW engines can last longer than previous systems and are more reliable in harsh environment. Moreover, they are fast fueling and they produce no emissions. The new HFC engines have applications in delivery vans and in light- and medium-duty cargo box trucks. The first consumers to use it in on-road applications will be in Asia and Europe, later this year. To date, more than 25,000 of these fuel cell units, which are an alternative to lead-acid batteries, have been shipped to dozens of customers, including big-name companies like Nike, Walmart and Amazon.com. These fuel cells have powered over 180 million hours of fleet operation.

Ref: <http://www.hydrogenfuelnews.com/>



Ref : phys.org/news/2018-01-material-fuel-cell-catalysts-hundredth.html

Hydrogenics to build world's largest hydrogen electrolysis plant in Canada

Hydrogenic's future hydrogen electrolysis plant will be a 20 megawatt (MW) electrolyzer system designed for a hydrogen production facility located in Canada. The Ontario-based leading developer and manufacturer of hydrogen generation and hydrogen fuel cell modules will design, build and install the system thanks to an award it received by Air Liquide Canada. The facility is expected to be operational by the end of next year. The 20 MW plant will utilize Hydrogenics' advanced large-scale PEM electrolysis technology. It will reportedly produce an output of slightly less than 3,000 tons of hydrogen annually. According to an official Hydrogenics press release, the hydrogen electrolysis plant will offer the smallest footprint and the highest power density in the industry.



Upcoming Events
Hypothesis XIV - 14th
HYdrogen POWer
THEoretical and
Engineering
Solutions
International
Symposium , Itaipu-
Brazil, 22-24 April
2019

International
Conference on
Hydrogen
Production (ICH2P-
2019) and 38th
Modern Science and
Energy Conference,
Cluj-Napoca,
Romania, 15th May-
2019

European Low-
Temperature Fuel
Cells /
Electrolysers & H2
Processing FORUM
, Lucerne,
Switzerland, July
2-7, 2019

2) Hypothesis XIV -
14th HYdrogen
POWer THEoretical
and Engineering
Solutions
International
Symposium , Itaipu-
Brazil, 22-24 April
2019
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Future Lies
Here

Ref: <http://www.hydrogenfuelnews.com/>

Toyota to help encourage Australians to drive hydrogen fuel cell vehicles

Hydrogen fuel cell vehicles are not a common sight on Australian roads, as is the case with most nations. The main reason for this is due to the fact that there is very little infrastructure available to support the use of these vehicles.

That being said, Toyota will be loaning its Mirai vehicles to give some Australian's a better understanding of what it's actually like to drive a hydrogen car. The hydrogen fuel cell vehicles on short-term loans from the Japanese automaker, will be shared between energy delivery provider AusNet Service and sister company Mondo and peak body, Hydrogen Mobility Australia. The short-term loans of the Mirais (approximately one to three month-long loans) will provide members of these organizations with the opportunity to sample what its like to drive fuel cell vehicles in the real world.

Ref: <http://www.hydrogenfuelnews.com/>



Hydrogen railway train under development in South Korea

The railway technology research project for which the hydrogen railway vehicle is being developed is part of a bigger objective to gradually replace the country's diesel railway trains. The project comes from the Ministry of Land, Infrastructure and Transport. The hydrogen railway train will be a hybrid vehicle that is powered by hydrogen fuel cells. It will be capable of travelling at a maximum speed of 110 km (68.4 miles) per hour and travel more than 600 km (372.8 miles) on a single refueling. The plan is to finish the development of the hydrogen fuel cell hybrid power system, power conversion system for railway cars, hydrogen refueling station construction plans and railway technology technical standard by the end of this year, reports FuelCellsWorks. Korea Railroad Research Institute plans to finish the verification of the stability and efficiency of the railway test line by 2022. The total investment in the project is 25 billion Won (\$22.2 million).



Ref: <http://www.hydrogenfuelnews.com/>