

Ads



Find Nano Powder A - Z

Oxide & metal nanopowder in stock order on-line for same day delivery
www.mtixtl.com



Free Webinar

Free webinar about safe reaction calorimetry. Watch it now for free!
mt.com/reaction-calorimetry

<https://www.sciencedaily.com/releases/2016/06/160627095937.htm>

Science News

from research organizations

Print Email Share

Scientists just made it cheaper to produce hydrogen from water

Date: June 27, 2016

Source: KTH The Royal Institute of Technology

Summary: A hydrogen-fuel economy could finally become a reality with the recent discovery of a cheap, stable and efficient means of getting hydrogen from water.

Share:

RELATED TOPICS

Matter & Energy

- > Alternative Fuels
- > Nature of Water
- > Fuel Cells

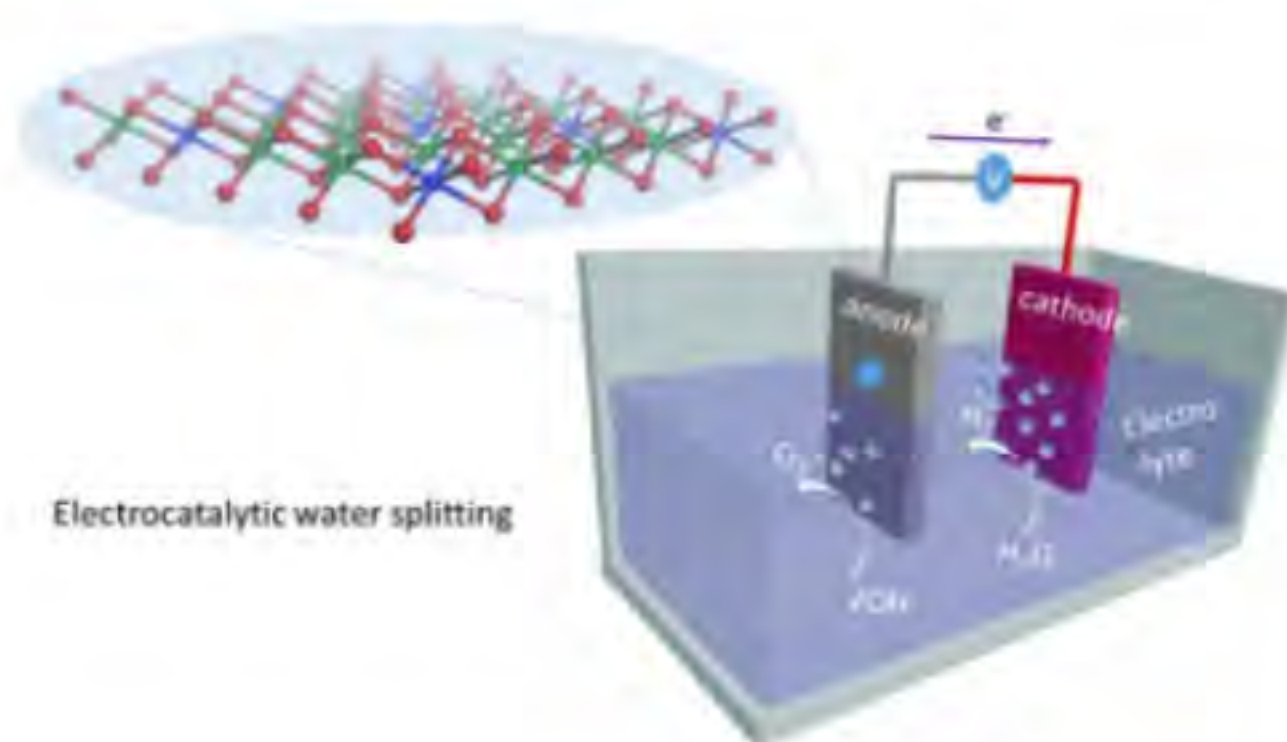
Earth & Climate

- > Water
- > Energy and the Environment
- > Drought Research

RELATED TERMS

- > Liquid nitrogen economy
- > Hydrogen vehicle
- > Hydrogen-like atom
- > Hydrogen
- > Fuel cell
- > Alternative fuel vehicle

FULL STORY



Electrocatalytic water splitting

Electrocatalytic water splitting is about to get less costly, thanks to research at KTH Royal Institute of Technology.

Credit: Image courtesy of KTH The Royal Institute of Technology

A hydrogen-fuel economy could finally become a reality with the recent discovery of a cheap, stable and efficient means of getting hydrogen from water.

If a cheap, stable and efficient way could be found to produce hydrogen from water, a hydrogen-fuel economy could finally become a reality.

Scientists at KTH Royal Institute of Technology in Stockholm now report that they have unlocked one major barrier to exploiting this renewable energy source.

Because the best-performing catalysts for electrochemical oxidation, or "water splitting," are expensive precious metals, the research team led by KTH Professor Licheng Sun is one of many worldwide searching for cheaper alternatives. Sun had earlier developed molecular catalysts for water oxidation (*Nature Chem.* 2012, 4, 418) with an efficiency approaching that of natural photosynthesis.

Last week his team reported in *Nature Communications* that it has discovered that a new material composed of common earth-abundant elements could be used as a catalyst for water splitting, which could help change the economics of large scale hydrogen fuel production.

Researcher Ke Fan says that the new material is a monolayered double hydroxide involving nickel and vanadium, which offers a state-of-art electrocatalyst for water oxidation. The low-cost, highly efficient nickel-vanadium monolayer outperforms other electrocatalysts that are composed of non-precious materials, Fan says. And it offers a competitive, cheap alternative to catalysts that rely on more expensive, precious materials, such as iridium oxide (IrO₂) or ruthenium oxide (RuO₂).

"This is the first time that the metal, vanadium, has been used to dope nickel hydroxide to form a water oxidation catalyst, and it works very well -- even beyond our expectations," Fan says. "No doubt this material can greatly expand the scope of non-precious metal elements of electrocatalysts, and it opens new areas for water splitting."

One possibility the discovery raises is large-scale production of hydrogen fuel using Sun's catalyst.

The material possesses a layered structure with monolayer nickel-vanadium



PW100 Engines for Sale!

Click Here

UTP FAST TO THE FLEET

Related Stories

Carbon Leads the Way in Clean Energy: New Method Uses Cheap Carbon-Based Catalyst to Deliver Energy Using Hydrogen

Mar. 22, 2016 — Groundbreaking research is leading the way in clean energy, with the use of carbon as a way to deliver energy using ... [read more »](#)

A New Solution for Storing Hydrogen Fuel for Alternative Energy

May 21, 2014 — Turning the 'hydrogen economy' concept into a reality, even on a small scale, has been a bumpy road, but scientists are developing a novel way to store hydrogen to smooth out the ... [read more »](#)

An Improved, Cost-Effective Catalyst for Water-Splitting Devices

Jan. 8, 2014 — Scientists have created a simple and scalable technique for greatly improving water splitting as a source of clean ... [read more »](#)

Producing Hydrogen from Water With Carbon/charcoal Powder

Aug. 28, 2013 — In the latest advance in efforts to find an inexpensive way to make hydrogen from ordinary water -- one of the keys to the much-discussed "hydrogen economy" -- scientists are reporting that ... [read more »](#)



PW100 Engines for Sale!

Click Here

UTP FAST TO THE FLEET



READY TO EARN MORE?

Become a Strategy Manager

GET STARTED!

Your capital is at risk. You may lose more than you invest.

FXTM

Osmometer made in Germany

Fast and effective measuring - competent after sales service!

● ○



oxygen polyhedron connected together with a thickness below 1 nanometer, says researcher Hong Chen.

"This monolayer feature not only increases the active surface area, but also enhances the electron transfer within the material," Chen says.

Sun expects the research to "open a new area of low-cost water oxidation catalysts, featuring stability and efficiencies that equal or even surpass some of today's best catalysts including RuO₂ and IrO₂."

Story Source:

The above post is reprinted from materials provided by **KTH The Royal Institute of Technology**. *Note: Materials may be edited for content and length.*

Journal Reference:

1. Ke Fan, Hong Chen, Yongfei Ji, Hui Huang, Per Martin Claesson, Quentin Daniel, Bertrand Philippe, Håkan Rensmo, Fusheng Li, Yi Luo, Licheng Sun. **Nickel–vanadium monolayer double hydroxide for efficient electrochemical water oxidation**. *Nature Communications*, 2016; 7: 11981 DOI: 10.1038/ncomms11981

Cite This Page:

MLA

APA

Chicago

KTH The Royal Institute of Technology. "Scientists just made it cheaper to produce hydrogen from water." *ScienceDaily*. ScienceDaily, 27 June 2016. <www.sciencedaily.com/releases/2016/06/160627095937.htm>.

Share This Page:



Powered by Google



How To Design A Garden

Ad [gardeningenthusiast.com](#)



Giant Ape Lived Alongside Humans

sciencedaily.com



PW100 Turbine Engines

Ad [utpparts.com](#)



Don't drink the (warm) water, study says

sciencedaily.com

NEXT >

Recommended Articles

Water splitter runs on an ordinary AAA battery
Stanford University, ScienceDaily, 2014

High-speed method to aid search for solar energy storage catalysts
University of Wisconsin-Madison, ScienceDaily, 2012

Single-catalyst water splitter produces clean-burning hydrogen 24/7
Stanford University, ScienceDaily, 2015

Hydrogen fuel from sunlight? Low-cost, long-lasting water splitter made of silicon and nickel
Stanford University, ScienceDaily, 2013

Carbon leads the way in clean energy: New method uses cheap carbon-based catalyst to deliver energy using hydrogen
Griffith University, ScienceDaily, 2016

New urine test may lessen need to draw blood
Catharine Paddock PhD, Medical News Today, 2015

Kidney failure: nanofiber mesh 'a cheap, wearable alternative to dialysis'
Honor Whiteman, Medical News Today, 2014

Pee-powered toilet could be game-changer for refugee camps
Catharine Paddock PhD, Medical News Today, 2015

Going Solar
IEEE Pulse, 2015

Spirometry: A Historical Gallery Up to 1905
IEEE Pulse, 2013

Strange & Offbeat

SPACE & TIME



Meet RobERT, the Dreaming Detective for Exoplanet Atmospheres



Moon Discovered Over Dwarf Planet Makemake in the Kuiper Belt



Opal Discovered in Antarctic Meteorite



The Martian Becomes Reality: At Least Four Crops Grown on Simulated Mars Soil Are Edible

MATTER & ENERGY



Shampoo Bottle That Empties Completely, Every Last Drop



Robots Come to Each Other's Aid When They Get the Signal



Seeds of Black Holes Could Be Revealed by Gravitational Waves Detected in Space



3-D Printing Produces Cartilage from Strands of Bioink

COMPUTERS & MATH



What Makes Individuals Nasty or Nice? Mathematical Model Explains



Particle Zoo in a Quantum Computer



Service Robot Floka's Big Debut



Making Computers Reason and Learn by Analogy

See fewer ads and support this site.

Contributor works on millions of sites and all of your devices.

Contributor
by Google

Powered by **Trend MD**

Print Email Share

Get the latest science news with ScienceDaily's free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

- Email Newsletters
- RSS Feeds

Keep up to date with the latest news from ScienceDaily via social networks:

- Facebook
- Twitter
- Google+
- LinkedIn

Get the latest news from ScienceDaily via our free mobile apps, available for download on the following platforms:

- iPhone/iPad
- Android

Tell us what you think of ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

- Leave Feedback
- Contact Us

[About This Site](#) | [Editorial Staff](#) | [Awards & Reviews](#) | [Contribute](#) | [Advertise](#) | [Privacy Policy](#) | [Terms of Use](#)

Copyright 2016 ScienceDaily or by third parties, where indicated. All rights controlled by their respective owners. Content on this website is for information only. It is not intended to provide medical or other professional advice. Views expressed here do not necessarily reflect those of ScienceDaily, its staff, its contributors, or its partners.