Input paper: [1] ENG7

Input paper for the following Committee(s): check as appropriate

□ ARM **X** ENG □ PAP

□ ENAV □ VTS

Purpose of paper:

□ Input

X Information

Agenda item [2] (from agenda)

Workplan Task Number / Technical Domain [2]

Working Group Committee

Author(s) / Submitter(s)

Developments in Battery Technology

1 LIHTIUM ION BASED DROP-IN LEAD-ACID BATTERY REPLACEMENT

SUPER-B Epsilon SB12V1200Wh-M

The Epsilon is a drop-in lead acid replacement, with all the benefits of Lithium Iron Phosphate. It has superior weight reduction, enormous energy reserves and stable voltage even at extreme loads.

Features, according to the manufacturer:

-Lithium Iron Phosphate (LiFePO4)

-Superior abuse tolerance

-Integrated BMS (Battery Management System)

-Integrated short circuit protection

-Battery monitoring/ history storage

-Adaptive cell balancing

-This battery is for 12V installation, parallel connection possible (do not put in series)

Performance;

-Low weight (-20kg compared to lead acid)

-High cycle count, up to 5000 cycles

-Low maintenance

-One on One replaceable with AGM/GEL lead acid batteries

->96% efficiency means more efficient (solar) charging and using almost all available energy

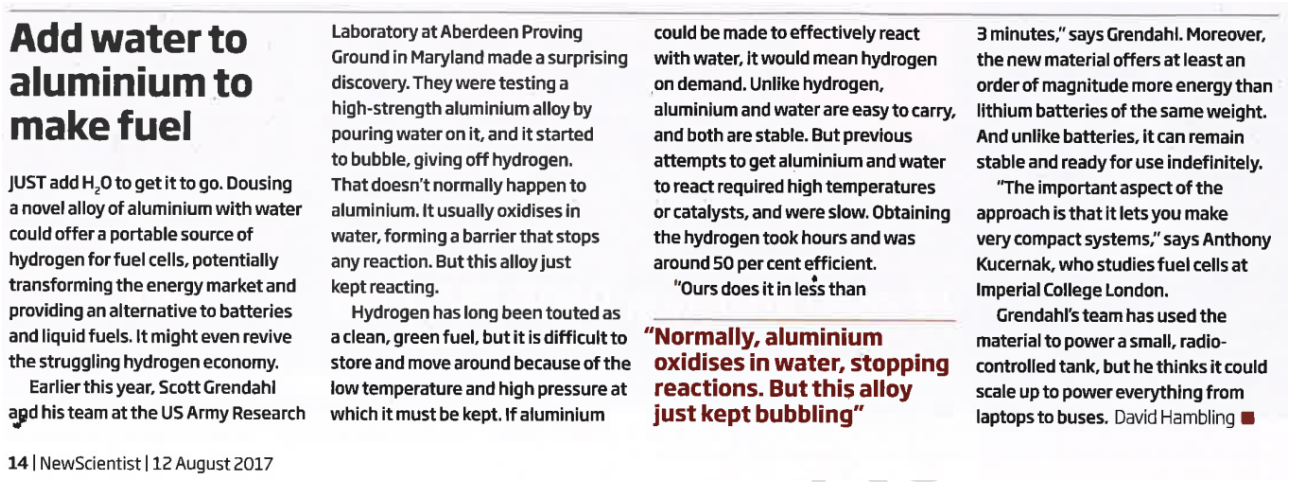
1 Input document number, to be assigned by the Committee Secretary

2 Input papers should be assigned to a work task as listed in the Committee work plan which is available in input papers. Leave open if uncertain but consider how the paper is to be processed if not relevant to a work task

2 HIGHT-STRENGHT ALUMINIUM AND WATER PRODUCES HYDROGEN

Normally aluminium oxidises in water. A research team in Aberdeen accidently found out that a certain high-strength aluminium inserted in water started to release hydrogen. Hydrogen has long been known as a clean, green fuel but difficult to store and handle. If aluminium and water could be used as a source for hydrogen on demand, it could be a possible solution for a safe and green fuel-cell battery in the future.

Source: NewScientist / August 2017



Add water to aluminium to make fuel

JUST add H_2O to get it to go. Dousing a novel alloy of aluminium with water could offer a portable source of hydrogen for fuel cells, potentially transforming the energy market and providing an alternative to batteries and liquid fuels. It might even revive the struggling hydrogen economy.

Earlier this year, Scott Grendahl and his team at the US Army Research Laboratory at Aberdeen Proving Ground in Maryland made a surprising discovery. They were testing a high-strength aluminium alloy by pouring water on it, and it started to bubble, giving off hydrogen. That doesn't normally happen to aluminium. It usually oxidises in water, forming a barrier that stops any reaction. But this alloy just kept reacting.

Hydrogen has long been touted as a clean, green fuel, but it is difficult to store and move around because of the low temperature and high pressure at which it must be kept. If aluminium could be made to effectively react with water, it would mean hydrogen on demand. Unlike hydrogen, aluminium and water are easy to carry, and both are stable. But previous attempts to get aluminium and water to react required high temperatures or catalysts, and were slow. Obtaining the hydrogen took hours and was around 50 per cent efficient.

"Ours does it in less than 3 minutes," says Grendahl. Moreover, the new material offers at least an order of magnitude more energy than lithium batteries of the same weight. And unlike batteries, it can remain stable and ready for use indefinitely.

"The important aspect of the approach is that it lets you make very compact systems," says Anthony Kucernak, who studies fuel cells at Imperial College London.

Grendahl's team has used the material to power a small, radio-controlled tank, but he thinks it could scale up to power everything from laptops to buses. David Hambling ■

"Normally, aluminium oxidises in water, stopping reactions. But this alloy just kept bubbling"

3 BATTERIES OF THE FUTURE

The attached article from the Elektromagazine, "Futuristic Fantasic Batteries", lists a number of potential future batteries. The technology ranges from microsupercapacitors to foldable batteries and a solid-state battery from MIT. They are all in an early stage, but interesting reading for anyone keen on keeping up with the latest research in battery technology.

ElektorBusiness Feature Article

Futuristic Fantastic Batteries

must charge in seconds, last months