

[Home](#)[My Network](#)[Jobs](#)[Messaging](#)[Notifications](#)[Me](#)[For Business](#)[Pre](#)[Edit article](#)[View stats](#)[View post](#)

MIT Paper: Using Aluminum and Water to make clean Hydrogen...

**Kirk Williams**

Oil and Gas Industry and technology Advisor

[4 articles](#)

August 20, 2021

[Open Immersive Reader](#)<https://news.mit.edu/2021/using-aluminum-and-water-to-make-clean-hydrogen-fuel-0812>

This paper published by MIT News on August 12th is a really great example of applying innovative thinking to a seemingly intransigent problem. The use of a mix of gallium and indium to effectively remove the oxide barrier to the water reacting with the aluminum is very clever, particularly so as the gallium/indium is not consumed and recoverable.

As a possible commercial source of hydrogen, the energy balance between recycling scrap aluminum by smelting and recasting verses this process to make hydrogen as an energy source (or storage) needs to be looked at. The paper is sadly short on the energy balance data. My quick maths on this shows it to be a poor source of energy. The main issue stems from the fact that aluminum is often referred to a "solidified electricity" due to the huge electrical power requirements of the electrolysis process

used to produce the metallic aluminum from alumina (aluminum oxide).

A quick estimate of numbers looks like this:

1. Production of 1 Kg of Aluminum: 174,000 KJ/Kg (*this excludes the upstream processing and logistics associated with mining, logistics and bauxite processing*)
2. Smelt scrap aluminum to ingots: 6,150 KJ/Kg
3. Energy recovered from H₂ produced from scrap Al + H₂O: 15,600 KJ/Kg of Al (*approximate, assuming 100% conversion eff and no logistics/storage energy cost*)

The recycling of the scrap aluminum for remelting and re-use is by far the most energy efficient thing to do, there is more than an order of magnitude greater energy recovery by recycling over production of H₂ from the scrap.

The electrical energy saved can be either not generated in thermal power stations, eliminating the associated CO₂ emissions, or free up renewable power for H₂ generation by electrolysis of water.

Published by



Kirk Williams
Oil and Gas Industry and technology Advisor
Published • 2y

[4 articles](#)

Making H₂ from scrap aluminum ?



Like



Comment



Share



Meg Hyde and 8 others

Reactions



0 Comments

Most relevant ▾



Add a comment...



Kirk Williams

Oil and Gas Industry and technology Advisor

More from Kirk Williams



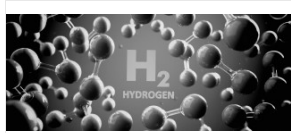
Net-Zero Transition for O&G Industry

Kirk Williams on LinkedIn



How Green is Blue Hydrogen ?

Kirk Williams on LinkedIn



Hydrogen Strategy: Looking beyond the hype

Kirk Williams on LinkedIn

- About
- Community Guidelines
- Privacy & Terms ▼
- Sales Solutions
- Safety Center

- Accessibility
- Careers
- Ad Choices
- Mobile

- Talent Solutions
- Marketing Solutions
- Advertising
- Small Business

-  **Questions?**
Visit our Help Center.
-  **Manage your account and privacy**
Go to your Settings.
-  **Recommendation transparency**
Learn more about Recommended Content.

Select Language

English (English)