

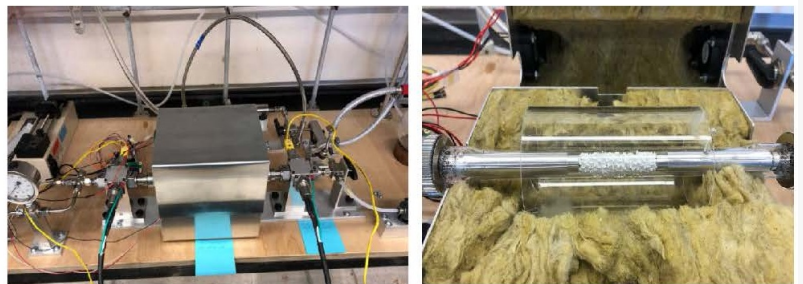
Hydrofuel Goes Solar Making Light Work for Golden Hydrogen with the University of Toronto Solar Fuels Group

A new process has been discovered that uses light to convert hydrogen carriers into low-cost golden hydrogen and other products.

TORONTO, ONTARIO, CANADA, July 20, 2023 /EINPresswire.com/ -- [Hydrofuel Canada Inc.](https://www.hydrofuel.ca) ("Hydrofuel"), a company engaged in the production and delivery of Green Ammonia and Hydrogen has entered into a \$1 Million dollar, two year "Opto-Chemical Engineering of High Efficiency and Low-Cost Photocatalysts and Photoreactors for Photoreforming Hydrogen Carriers" Licensing and Cooperation Agreement with University of Toronto's ("UofT") [Solar Fuels Group](https://www.sfgroup.ca) ("SFG").

Photoreforming Hydrogen Carriers
The only clean burning non-toxic fuel for a sustainable future is hydrogen as the only product is water. It has myriad uses for powering transportation, electricity production, running a range of industrial processes, and keeping our businesses and industries warm, with a net zero carbon footprint.

Inconveniently, the transportation and storage of hydrogen in gaseous or liquid form pose technological, economical and safety challenges. This difficulty in principle can be circumvented with the use of abundant small molecule hydrogen carriers, exemplified but not limited to methane, ammonia, and water as the source of hydrogen.



Photoreforming annular flow photoreactor with photocatalytic foam and light emitting diode array light source

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The prior art in this emerging field shows that the conversion of these molecules to hydrogen requires some form of energy to drive the conversion process currently enabled mostly by fossil fuel powered heat or electricity, making this kind of hydrogen far from being green.



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The partnership between the Solar Fuels Group and Hydrofuel brings a paradigm shift to the science and technology of generating hydrogen from hydrogen carriers. Instead of using non-renewable heat or electricity the team utilizes light as the sole energy source thereby making the hydrogen the greenest form possible, called golden hydrogen. The central objective of the

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*Professor Geoffrey Ozin, UofT
Solar Fuels Group*

partnership is to engineer optically and chemically, photocatalysts and photoreactors with the highest efficiency and lowest cost, scalability and durability, for photo-reforming hydrogen carriers to golden hydrogen.

In this regard, research on opto-chemically engineered photocatalysts and photoreactors, pioneered by the University of Toronto Solar Fuels Group is proving indispensable and we are delighted to share this expertise with Hydrofuel to help them produce golden hydrogen from abundant hydrogen carriers and thereby contribute to the Utopian dream of a sustainable future for Canada and the rest of the world.

Patent Portfolio

Patent applications have been filed for six initial Opto-Chemical Engineering based technologies:

- Photochemical reforming of hydrogen vectors
- Single atom photochemical reforming of hydrogen vectors
- Photochemical reverse Boudouard process
- Photochemical reforming of ethane to ethene and hydrogen
- Photoreforming of hydrogen carrier polymers
- Single atom photochemical reforming of polymers

Background

The two year \$1 Million dollar funding commitment from Hydrofuel will allow the Solar Fuels Group to retain 6 Post Doctoral and Doctoral candidates to continue their ground-breaking research to identify the optimum photocatalysts and photoreactors for photo reforming a range of hydrogen carriers to golden hydrogen. The funding will also enable them to scale up the

science to a practical technology toward commercialization.

About Hydrofuel Canada Inc.

Located in Mississauga, Ontario, Hydrofuel Canada Inc. is focused on providing low cost, last-mile Green Ammonia and Hydrogen solutions to its customers. In addition to the UofT's SFG technology, Hydrofuel's other technologies include [MAPS technology](#) for low-volume, low cost production of Green Ammonia, and conversion technology to run diesel and gasoline ICEs on green ammonia. Hydrofuel has over 40 years of experience in Ammonia energy and fuel systems technologies. Hydrofuel®™ is a registered Trademark in Canada, the US, and EU.

<https://nh3fuel.com>.

About the University of Toronto's Solar Fuels Group:

Located in the Chemistry Department at the University Toronto. The group established and spearheaded by Professor Geoffrey Ozin, are renown for engineering light to catalytically transform molecules exemplified by carbon dioxide, nitrogen, methane, and water into a wide range of value-added commodity chemicals and fuels. www.solarfuels.utoronto.ca.

For further details on Professor Ozin's photocatalysis and photoreactor research see:

Geoffrey Ozin, Author at Advanced Science News

<https://www.advancedsciencenews.com/author/gozin/>

□Geoffrey A. Ozin□, University of Toronto, Canada, Google Scholar□ - □□Cited by 73,407□□ - □Nanomaterials□ - □Nanotechnology□ - □ArtNano□ - □Space□ - □Carbon□

https://scholar.google.ca/citations?hl=en&user=zpzkdCAAAAJ&view_op=list_works&sortby=pubdate

Accelerated opto-chemical engineering solutions to CO2 photocatalysis for a sustainable future

<https://www.sciencedirect.com/science/article/pii/S2590238522004544>.

Decarbonizing the chemical industry with sustainable photons

<https://www.advancedsciencenews.com/decarbonizing-the-chemical-industry-with-sustainable-photons>.

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