

SWAN-H : Deeptech start-up disrupting ammonia production for hydrogen storage and green fertilizers

TOULOUSE, October 28th, 2022 – Swan-H SAS (“Swan-H”) is pleased to announce the closing of its Seed funding round and the publication of “Ammonia Synthesis at Room Temperature and Atmospheric Pressure from N₂ : A Boron-Radical Approach” in “Angewandte Chemie”, a top-tier chemistry journal.

The CNRS spin-off raised 1.5M€ from business angels to support its lab operations in Toulouse.

The team, led by Swan-H co-founder Dr. Nicolas Mézailles, found and patented a revolutionary way to produce ammonia (NH₃). The Mézailles method activates nitrogen present in the air and makes it react with water. Nitrogen, one of the most stable molecule known, is activated and made reactive using orders of magnitude less energy compared to current industrial method. Since this initial discovery, the process now functions with electricity as an energy source.

A century-old process with a huge carbon footprint

Ammonia, is currently produced in huge plants, requiring natural gas, high pressures and extreme temperatures. **This 100-year old Haber-Bosch process releases large amounts of CO₂.**

Ammonia set to unlock the hydrogen economy

Ammonia vs Hydrogen

- Ammonia **storage** requires **less energy** than hydrogen (e.g. requires 10 bar pressure vs. up to 700 for hydrogen, at room temperature)
- Ammonia is **energetically denser** than hydrogen, meaning more energy is stored in the same volume
- Ammonia can be **transported in existing natural gas infrastructures**, rather than costly new systems for hydrogen
- Ammonia can be **used as fuel** directly, or be **converted** back to hydrogen and nitrogen

Ammonia production figures

- **200+ million tons** produced annually, mainly used in agriculture
- Responsible for **~2% of global CO₂ emissions**
- Usage could reach 600M tons to replace shipping fuel

The Mézailles process, which uses boron radicals to enable nitrogen to react paves the way for a revolution: **reduce the CO₂ footprint of ammonia production and allow new applications for ammonia**, in particular modular renewable energy storage.

Speaking about the company, Steve van Zutphen, the CEO of Swan-H commented: *“Ammonia is an ideal energy carrier, but has been largely overlooked because of the energy needed to produce enough of it. Our low-energy Mézailles process has the potential to position ammonia at the heart of a new carbon-free energy system, making it possible to effectively store renewable energy such as wind and solar.”*

About Swan-H

Swan-H develops a radical innovation enabling clean ammonia production. Based on a patented chemical process developed in the “Laboratoire Hétérochimie Fondamentale et Appliquée” (LHFA; Fundamental and Applied Heterochemistry Laboratory) Lab of CNRS (UMR 5069) at University Toulouse III Paul Sabatier, the start-up was founded in December 2021 with support from Toulouse Tech Transfert (TTT). Led by a team of four experienced entrepreneurs, the company secured seed funding from business angels in February 2022 and support from Banque Publique d’Investissement’s (BPI) Deeptech fund.

The research team, based at *la Maison de la Recherche et de la Valorisation* in Toulouse, is expecting to be 10-members strong by the end of this year, and to double in size by 2024. A series A funding round, to accelerate industrialisation of the prototype ammonia production system, is planned in 2023.

Contacts

Augustin de Bettignies – Chief Business Officer – swan@swan-h.com

 <https://www.linkedin.com/company/swan-h/>

 https://twitter.com/Swan_H_Tech

References:

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