

# Media Release

## Clariant Catalysts collaborates with Hydrogenious Technologies in breakthrough hydrogen storage and logistics technology

- Clariant's EleMax<sup>®</sup> catalysts play vital role in Hydrogenious Technologies' efficient hydrogen and energy supply solution
- The innovative Liquid Organic Hydrogen Carrier (LOHC) technology significantly improves safety, scalability and convenience in hydrogen storage and transportation
- Convenient installation for industrial use or hydrogen refueling stations, transportable in existing infrastructure for fossil fuels

Munich, June 12, 2018 – Clariant, a world leader in specialty chemicals, today announced that its Catalysts business has formed an alliance with award-winning clean energy company, Hydrogenious Technologies, to provide reliable, scalable and safe hydrogen supply solutions for a wide variety of applications.

Hydrogen from renewable energy sources, such as wind and hydro power, has long been recognized as a more efficient and more environmentally friendly fuel. However, fluctuations in weather conditions necessitate cost-effective, large-scale storage in order to ensure a steady supply of electrical energy. Moreover, hydrogen's very low density, high flammability and extreme volatility present significant challenges to both storage and transportation. Conventional storage methods typically involve either physical compression (200–700 bar) or extreme cooling (–253°C) of hydrogen, both of which are energy intensive and carry significant safety risks.

In what has been a major leap forward, Hydrogenious Technologies, has developed a highly innovative means of transporting hydrogen by chemically binding the molecules to Liquid Organic Hydrogen Carriers (LOHC). In the unique method, hydrogenation of the liquid organic hydrocarbon dibenzyltoluene via Clariant's EleMax H catalyst allows hydrogen to be 'stored', while its dehydrogenation with EleMax D 'releases' hydrogen on demand. The highly active Clariant catalysts are designed to offer exceptional selectivity for loading and unbinding hydrogen in order to optimize the life-cycle and efficiency of the LOHC.

Non-explosive, non-toxic and of low flammability, the diesel-like hydrogen-bound compound is not classified a hazardous good, and remains in a useable and convenient liquid state through a broad temperature range of -39°C to 39°C at ambient pressure.

These factors allow considerably easier installation at industrial locations as well as commercial and public fueling sites, even in close range of or within residential areas. It furthermore allows for the handling flexibility required to enable a wide spread roll-out of hydrogen production from renewable power sources (Power-to-Gas).

Hydrogenious Technologies' revolutionary solution and Clariant's specialized catalysts now present a safer, more efficient alternative for storing and transporting very large amounts of clean hydrogen from renewable source to enable emission-free mobility and cleaner industry processes. First commercial scale units in operation for example at United Hydrogen Group (Tennessee) confirm the expected technical and economic attractiveness. Clariant will continue to further broaden the applicability and efficiency of this advantageous technology offered by Hydrogenious via catalyst research and expertise.

Marvin Estenfelder, Head of R&D at Clariant's Business Unit Catalysts, welcomed the alliance, stating, "We are delighted to partner with Hydrogenious Technologies in the evolution of renewable energy and global efforts for sectoral integration. The successful development of dedicated catalysts for LOHC technology is not only testament to Clariant's pioneering capabilities, but also reflects the importance of sustainability to our culture, operations, and as a driver for growth and innovation."

Daniel Teichmann, CEO at Hydrogenious Technologies, considers the cooperation with Clariant to be as well future-oriented. "As an innovation driven company, Hydrogenious Technologies goes hand in hand with Clariant to provide the energy sector with sustainable energy and mobility. The partnership with Clariant is not only a 'catalyst' for the LOHC technology, but also an acceleration of our mission into a decarbonized world with an economic and ecological hydrogen approach. It is a further step towards our vision to make the much discussed hydrogen economy a global reality," emphasizes Daniel Teichmann.



Delivery of the Liquid Organic Hydrogen Carriers (LOHC) applications at the United Hydrogen Group (Tennessee, USA).  
(Photo: Hydrogenious Technologies GmbH)



Liquid Organic Hydrogen Carriers (LOHC) applications (the Hydrogenious Technologies StorageBOX) at the United Hydrogen Group (Tennessee, USA). (Photo: Hydrogenious Technologies GmbH)

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Clariant is a globally leading specialty chemicals company, based in Muttenz near Basel/Switzerland. On 31 December 2017 the company employed a total workforce of 18 135. In the financial year 2017, Clariant recorded sales of CHF 6.377 billion for its continuing businesses. The company reports in four business areas: Care Chemicals, Catalysis, Natural Resources, and Plastics & Coatings. Clariant's corporate strategy is based on five pillars: focus on innovation through R&D, add value with sustainability, reposition portfolio, intensity growth, and increase profitability.

[www.clariant.com/catalysts](http://www.clariant.com/catalysts)

Clariant's Catalysts business unit is a leading global developer and producer of catalysts for industrial processes. It has been part of the Catalysis business area of the Clariant Group since the acquisition of Süd-Chemie in 2011. Clariant Catalysts is headquartered in Munich, Germany, and has a total of 16 production sites (incl Joint Ventures), 7 sales offices, and 11 R&D and technical centers around the world. Approximately 1 970 employees serve customers across all regional markets. Aimed at delivering sustainable value to customers, Clariant's catalysts and adsorbents are designed to increase production throughput, lower energy consumption, and reduce hazardous emissions from industrial processes. The broad portfolio also includes products that enable the use of alternative feedstock for chemical and fuel production.

[www.hydrogenious.com](http://www.hydrogenious.com)

Founded in 2013 by its CEO Dr. Daniel Teichmann and the three co-founders Prof. Wolfgang Arlt, Prof. Peter Wasserscheid and Prof. Eberhard Schlücker, Hydrogenious Technologies is a spin-off of Friedrich-Alexander-University Erlangen-Nuremberg. The shareholdings of the University of Erlangen-Nuremberg and Anglo American Platinum as well as a successful third round of financing with Zhongshan Broad-Ocean Motor Co., Ltd. in December 2017 back Hydrogenious Technologies with strong scientific, strategic and financial capacities. Hydrogenious Technologies is a global pioneer in Liquid Organic Hydrogen Carrier (LOHC)-based hydrogen technologies and builds hydrogen storage systems for industrial hydrogen logistics and refuelling stations based on the LOHC technology. The company has 55 employees and is based in Germany, Erlangen.

Press release and photography can be downloaded from [www.clariant.com](http://www.clariant.com) or [www.PressReleaseFinder.com](http://www.PressReleaseFinder.com).