

News Release

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Stargate Hydrogen uses BASF's Ultrason® for lightweight and durable frames in its Stellar electrolyzer stacks

- **AWE stacks by Stargate Hydrogen enable scalable, reliable and cost-efficient production of green hydrogen**
- **BASF's polysulfone Ultrason® S combines excellent chemical resistance, stable mechanical properties in harsh conditions with optimal thermoplastic processing**
- **Ultrason® is especially suited where metal and PPS fail to meet requirements of AWE, PEM, AEM electrolyzers**
- **BASF at K 2025: Hall 5 Booth C21/D21, Messe Düsseldorf, Germany**

The electrolyzer manufacturer Stargate Hydrogen, Estonia, is now using BASF's Ultrason® to manufacture the frames in its stacks used for alkaline water electrolyzers (AWE). The polysulfone (PSU) Ultrason® S replaces metals such as nickel, resulting in significantly lighter stacks. This substitution is possible because BASF's high-performance thermoplastic offers high temperature and chemical resistance also in harsh alkaline conditions. It can withstand high stack pressures due to excellent compression strength. As Ultrason® can be injection-molded, it provides greater design flexibility for easier functional integration than metal. The collaboration between Stargate Hydrogen and BASF has yielded an exceptional result: the pressurized stacks of the Stellar series are designed for long operational lifespans, supporting reliable hydrogen production, and reducing downtime and maintenance costs. This durability enhances the economic feasibility of green hydrogen production, making it a cost-effective solution.

Alkaline electrolyzers are the most robust and proven form of electrolysis for producing hydrogen from water. “Stargate Hydrogen manufactures electrolyzer stacks to empower system integrators with the most flexible and scalable technology,” says Marko Virkebau, CEO of Stargate Hydrogen. “We deliver not only a piece of hardware but a partnership from day one until hydrogen is being produced reliably. We build upon the best aspects of AWE technology and complement it with breakthrough materials. This is why we chose BASF’s Ultrason® for the frames in our Stellar electrolyzer series: it combines light weight with outstanding performance, thus helping us to improve the efficiency and lower the cost of alkaline electrolyzers.” This results in a new class of electrolyzers with high current densities, offering an innovative approach to decarbonizing sectors such as heavy transport, steel manufacturing and the chemical industry.

Tailored Ultrason® portfolio for scaling up hydrogen production

The patent-pending design of Stargate Hydrogen’s Stellar stacks incorporates frames with a diameter of 85 cm. BASF’s specialty plastic Ultrason® enables these frames to be large, robust, and durable, with a focus on higher operating temperatures and extended lifetimes. It withstands the extreme forces in AWE systems and shows excellent hydrolytic stability. Its stable mechanical properties make it suitable for current (90 °C) and future (>100 °C) electrolyzers.

“With Ultrason®, our customers can upscale green hydrogen production, thus advancing the transformation to clean energy,” says Jochen Schmid from Global Business Development Ultrason® at BASF. “Its excellent performance under the harsh conditions of water electrolysis makes it the ideal material for various electrolyzer technologies and applications. We are proud to support Stargate Hydrogen in its scale-up strategy — from selecting the appropriate Ultrason® grade to part and tool design and final frame production.” BASF offers a tailored Ultrason® portfolio to meet the specific performance requirements of alkaline water (AWE), proton exchange membrane (PEM), and anion exchange membrane (AEM) electrolyzers. Supported by BASF’s application expertise and local technical support, the material range for electrolyzer components includes polyarylethersulfones (PSU, PESU, PPSU) for frames, gaskets, and separator membranes.

Ultrason® is the trade name for BASF’s product range of polyethersulfone (Ultrason®)

E), polysulfone (Ultrason® S) and polyphenylsulfone (Ultrason® P). The high-performance thermoplastic is used to manufacture water filtration membranes, stylish, durable and safe household and catering applications as well as lightweight components for the automotive and aerospace industries. Ultrason® brands can substitute thermosets, metals, glass and ceramics in many applications because of their extraordinary property profile.

More information: www.ultrason.basf.com/hydrogen

About BASF at K 2025: Welcome to #OurPlasticsJourney!

#OurPlasticsJourney continues in 2025 at K! Join us at our booth in Hall 5, C21/D21 and discover how to start your green transformation. At BASF, we look at the entire lifecycle of plastics with Make, Use and Recycle. Come and explore sustainability and innovation in high-performance plastics at K 2025. K is the #1 trade fair for plastics and rubber and will take place in Duesseldorf, Germany, from October 8 to 15, 2025. Visit www.plastics.basf.com/K2025.

About BASF

At BASF, we create chemistry for a sustainable future. Our ambition: We want to be the preferred chemical company to enable our customers' green transformation. We combine economic success with environmental protection and social responsibility. Around 112,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio comprises, as core businesses, the segments Chemicals, Materials, Industrial Solutions, and Nutrition & Care; our standalone businesses are bundled in the segments Surface Technologies and Agricultural Solutions. BASF generated sales of €65.3 billion in 2024. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the United States. Further information at www.basf.com.