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News Release

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Shell qualifies BASF Puristar® and BASF Sorbead® for green hydrogen purification

- **Puristar® R0-20 is a robust, versatile, and proven catalyst that excels at removing trace oxygen from the hydrogen stream following electrolysis**
- **Sorbead® Adsorption Technology provides a reliable, low-energy solution for hydrogen dehydration to achieve low water outlet specifications**
- **Green hydrogen purification is a critical step required for further processing, transport, and usage of hydrogen as an energy source or chemical feedstock**

BASF has worked with Shell to evaluate and de-risk BASF's Puristar® R0-20 and Sorbead® Adsorption Technology for the use in green hydrogen production. The two technologies purify and dehydrate the product hydrogen stream from the water electrolysis process which can then be used for liquification and transportation, as an energy source or chemical feedstock. The Puristar and Sorbead technologies are now in Shell's portfolio for potential use in Shell's global green hydrogen projects.

The hydrogen product stream from water electrolysis contains water and remnant oxygen, which are impurities that need to be removed prior to downstream processing or utilization of the hydrogen. First, the Puristar R0-20 catalyst removes the oxygen by converting it to water in the DeOxo Unit. After the DeOxo step, Sorbead Adsorption Technology is used to dehydrate the hydrogen. Following the hydrogen purification, the hydrogen can be used as an energy source or chemical feedstock. Through recent R&D and pilot activities, BASF has created a new DeOxo design tool that focused specifically on optimizing DeOxo units operating downstream of an electrolyzer. This new modelling tool allows for the design of

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smaller DeOxo vessels, providing CapEx and OpEx benefits to the project.

The highly efficient Puristar R0-20 catalyst operates at low temperatures and with minimal precious metal content in the catalyst. Additionally, BASF Sorbead Adsorption provides several advantages for green hydrogen applications, including a minimal energy footprint compared to alternative materials, reliability, simple operation, high capacity for water, and lower regeneration temperatures compared to activated alumina or molecular sieves. Customers also benefit from long life, operational turndown flexibility and immediate on-spec gas at startup.

“BASF shares the ambition of Shell to work towards net-zero emissions in the future. Green hydrogen is a major component in achieving this goal and the de-risking of Puristar R0-20 and Sorbead Adsorption Technology for Shell’s projects will support us on our way”, said Detlef Ruff, Senior Vice President, Process Catalysts at BASF.

About BASF’s Catalysts Division

BASF’s Catalysts division is the world’s leading supplier of environmental and process catalysts. The group offers exceptional expertise in the development of technologies that protect the air we breathe, produce the fuels that power our world and ensure efficient production of a wide variety of chemicals, plastics and other products, including advanced battery materials. By leveraging our industry-leading R&D platforms, passion for innovation and deep knowledge of precious and base metals, BASF’s Catalysts division develops unique, proprietary solutions that drive customer success. Further information on BASF’s Catalysts division is available on the Internet at www.catalysts.basf.com.

About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. Around 111,000 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 six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care and Agricultural Solutions. BASF generated sales of €78.6 billion in 2021. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the U.S. Further information at basf.com.