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“Research and Development of Large-scale Ammonia Cracking Technology for Low-carbon Hydrogen Production by Tubular Ammonia Cracking Furnace” Selected as a NEDO “Development of Technologies for Building a Competitive Hydrogen Supply Chain”

JGC HOLDINGS CORPORATION
Kubota Corporation
TAIYO NIPPON SANSO CORPORATION

JGC HOLDINGS CORPORATION (Representative Director, Chairman and CEO: Masayuki Sato; “JGC HD”), Kubota Corporation (President and Representative Director: Yuichi Kitao; “Kubota”), and TAIYO NIPPON SANSO CORPORATION (Representative Director, President: Kenji Nagata; “TAIYO NIPPON SANSO”) jointly submitted an application for a New Energy and Industrial Technology Development Organization (NEDO) “Development of Technologies for Building a Competitive Hydrogen Supply Chain” (the “Project”), and have now received notification of their selection.

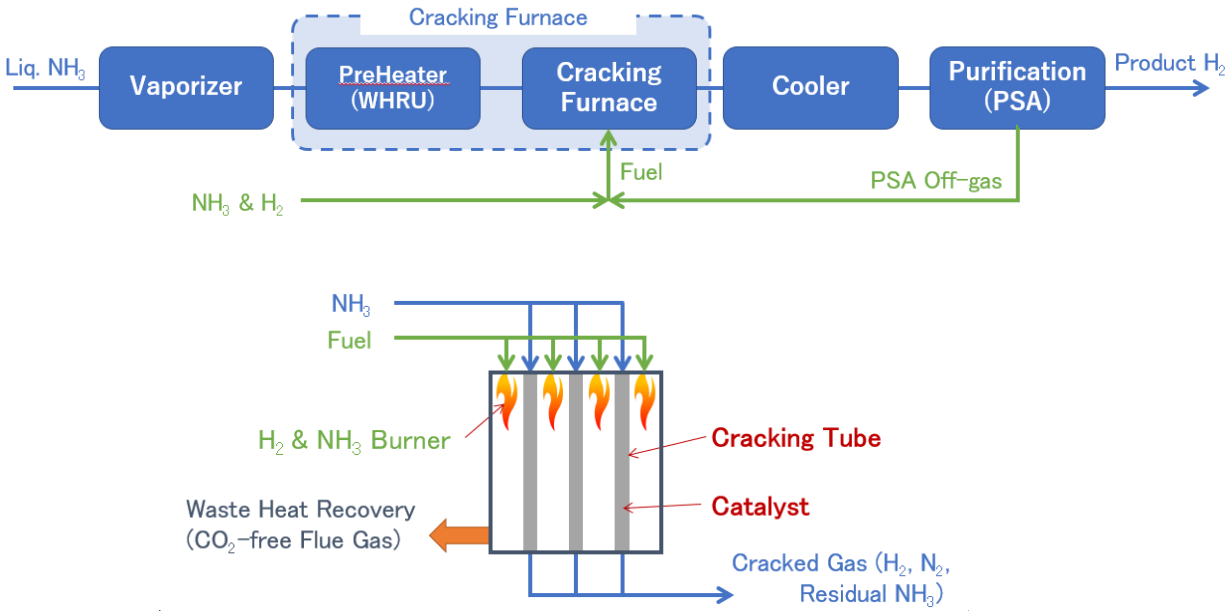
Global warming is an issue on a worldwide scale, and the shift to low-carbon and decarbonized sources of energy is a significant challenge. Hydrogen is attracting attention as a next-generation energy source because it does not emit carbon dioxide during combustion.

The objectives of the Project include the development of the necessary component technologies to build a hydrogen supply chain, and support for the acquisition of data required for the creation of regulations and international standards. The three companies proposed the “research and development of large-scale external thermal ammonia decomposition hydrogen production technology” (the “R&D”), in which hydrogen will be obtained from the thermal decomposition of imported ammonia, in anticipation of participation in a large-scale hydrogen production project with an annual output of 110,000 tons.

NEDO website: Determination of Implementation System for Second Call for Submissions for Fiscal 2023 “Development of Technologies for Building a Competitive Hydrogen Supply Chain”
https://www.nedo.go.jp/koubo/SE3_100001_00040.html

The R&D aims to optimize the entire process, from the gasification of imported liquid ammonia, to the thermal decomposition of preheated ammonia gas using an Tubular Ammonia Cracking Furnace, and the subsequent cooling of the cracked gases to purify

hydrogen. At present, many of the component technologies for producing hydrogen by ammonia cracking have reached the commercial level, but they are commercialized only in small systems, and not on a large scale. Among these component technologies, further component test-based verification and development is required for ammonia cracking tubes and stage hydrogen gas purification system that removes nitrogen gas and ammonia from ammonia decomposition gas in one stage (using the PSA method), and the R&D is expected to result in progress in this area. The entire process must also be optimized in accordance with the application and specification of the hydrogen, and the R&D thus also aims to solve these challenges. The R&D will be conducted during fiscal 2023 and fiscal 2024.



Process flow of the R&D and cracking furnace concept image

JGC HD will supervise the Project, and will also design and develop the entire process and the cracking furnace, plan the demonstration, and estimate the costs. Kubota will research and develop ammonia cracking tubes, and TAIYO NIPPON SANSO will research and develop hydrogen purification systems. Idemitsu Kosan Co., Ltd. (“Idemitsu Kosan”), to whom JGC HD is outsourcing research, will be responsible for examining the demonstration site and support the planning of demonstration tests.

The technology, expertise, and track record of each company that will be utilized in the R&D are as follows.

< JGC HD >
・ Large-scale natural gas steam-methane reforming technology
・ Track record of developing blue hydrogen production package

< Kubota >
・ Production and materials technology for heat-resistant cast steel tubes used in petrochemicals plants, etc.
・ Track record of global sales of ethylene cracking tubes, steam-methane reforming tubes, and other reaction tubes
・ Technology for developing metal materials for use in harsh environments, such as high temperatures and corrosive environments

< TAIYO NIPPON SANSO >
・ Track record of developing high-purity hydrogen gas purification systems for hydrogen purification

< IDEMITSU KOSAN >
・ Track record of operating hydrogen production systems

Going forward, JGC HD, Kubota, and TAIYO NIPPON SANSO will together play a leading role in the development of technology for the large-scale production of hydrogen, an essential element for the carbon-neutral society, in anticipation of its social implementation in the year 2030, when the use of hydrogen is expected to increase in Japan and overseas.

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