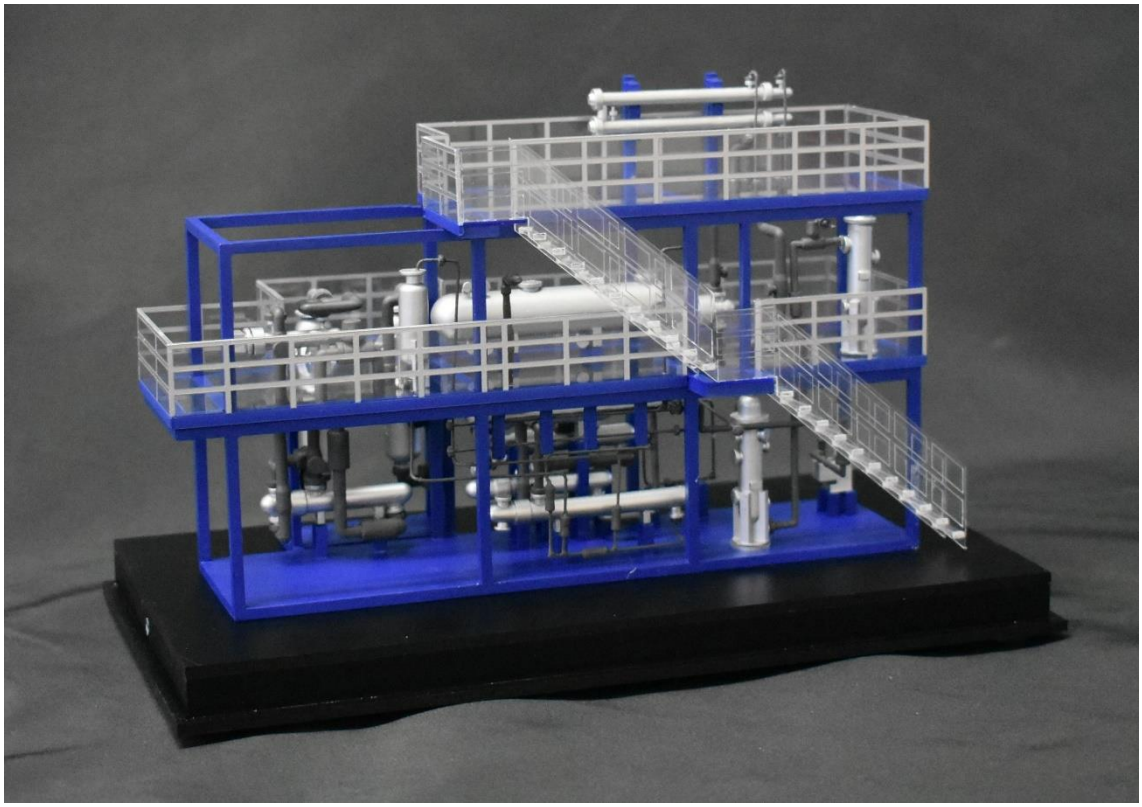
Tsubame BHB Co., Ltd.

August 27, 2024

Tsubame BHB receives order for 2nd unit in Japan; installing small ammonia manufacturing facilities for industrial use

Responds to reductions in domestic ammonia production volumes and rapidly increasing import prices through on-site ammonia production

Tsubame BHB Co., Ltd. (Head Office: Yokohama, Kanagawa Pref.; CEO: Koji Nakamura), which is aiming for the social implementation and commercialization of ammonia manufacturing plants that can synthesize ammonia at low temperatures and low pressures, has received an order for small ammonia synthesizing facilities, the second commercial unit in Japan for industrial applications.



Plant image

In recent years, an increasing number of ammonia production plants in Japan are shutting down, and with rapidly increasing import prices, there has been a growing concern regarding the ammonia supply chain. On-site ammonia production facilities that utilize Tsubame BHB's electride catalyst technologies resolve these issues, achieving stable ammonia supply.

The small ammonia synthesis facilities recently ordered have an annual production capacity

of 500 tons. Tsubame BHB will supply the small ammonia manufacturing facilities, as well as the ammonia synthesis catalysts. The customer is also considering future expansion of these small ammonia manufacturing facilities.

Schedule

- Customer verified introduction of Tsubame BHB's technologies from 2022
- Basic design began in January 2024, and detailed design began in August 2024
- Startup of ammonia production scheduled for around the summer of 2026

Background

Approximately 80% of the ammonia used worldwide is used in fertilizers, and the remaining 20% is used in industrial applications. Ammonia applications in Japan focus mainly on industrial uses such as raw material for chemicals or denitrification at thermal power plants. About 80% of the roughly 1 million tons consumed annually is produced domestically, and the other 20% is imported[*1].

Since 2000, ammonia production plants in Japan have been suspending operations; there are currently four ammonia production companies in Japan, and ammonia production volumes have declined from 2 million tons in 2000 to around 1 million tons in 2022[*2]. Furthermore, one of the manufacturers with the highest ammonia production volumes has expressed its intent to suspend domestic production of ammonia by 2030, so domestic production will be handled by the remaining three companies[*3]. There are also concerns about the supply of ammonia from Russia, the world's second-largest ammonia producer, due to the effects of the war with Ukraine, and amid the various supply related problems arising in the main user countries, the price of imports into Japan is increasing dramatically. In this backdrop, companies around the world with a need for ammonia have deep concerns about procurement moving forward.

*1 Ref.: November 25, 2021; International prices for ammonia are increasing; EnergyShift

*2 Ref.: December 13, 2022; The Chemical Daily; Domestic production of ammonia is at a crossroad; structural reforms looming

*3 Ref.: May 20, 2022; Nihon Keizai Shimbun (electronic version); UBE evaluates structural reforms; dramatic reduction in greenhouse gases

Unique features of Tsubame BHB's on-site ammonia plant

The products offered by Tsubame BHB are ammonia manufacturing facilities that use electride catalysts to synthesize ammonia at low temperatures and low pressures. Currently, ammonia is mainly produced using the Haber–Bosch process (the HB process), which was discovered more than 100 years ago. The HB process requires high-temperature and high-pressure response conditions, and involves heavily concentrated,

high-volume production at large-scale plants with a high energy load, and the substantial capital investments are also an issue. Because the ammonia must be transported from the production bases to locations where they are being used around the world, specialized transport equipment and storage facilities are also needed, resulting in high logistics costs.

Tsubame BHB resolves these issues by offering ammonia manufacturing facilities that use electride catalysts which enable highly efficient ammonia synthesis under low-temperature, low-pressure conditions. With low-temperature, low-pressure response conditions based on electride catalysts, it became possible to produce ammonia at small-scale plants with an annual capacity of just a few tens of thousands of tons, which was considered difficult when using the conventional HB process[*4]. Tsubame BHB's technologies achieve on-site ammonia production, to produce ammonia where it is needed, and in the volumes required.

*4 Generally, ammonia production using the HB process requires annual volumes on a scale of 100,000 tons or more.

Future developments

In recent years, there has been growing attention on a new ammonia application as a carrier of fuel and hydrogen. The first unit for which Tsubame BHB received an order is currently under construction in Niigata, and is undergoing verification with a view toward fuel and hydrogen carrier applications. By providing on-site ammonia manufacturing facilities to users of fuel and hydrogen carriers and ammonia for industrial and fertilizer applications, the company will respond to the uncertainty in the market and contribute to a stable supply of ammonia. It will also contribute to the effective use of small-scale, distributed renewable energy, and to promoting decarbonization through the use of this energy.

Comment from Tsubame BHB CEO Koji Nakamura

Since we received an order for a second unit in Japan, I have been aware of the strong demand for on-site ammonia production. Tsubame BHB's ammonia production technologies are unique in that they operate under low-temperature, low-pressure conditions, and they also contribute to decarbonization by promoting the use of renewable energy. Amid the recent Ukraine conflict, the EU is no longer able to procure inexpensive natural gas from Russia, and this has led to the shutdown of many ammonia plants, with increasing risks to the supply chain. The Japanese company that placed the recent order also decided to introduce our on-site ammonia manufacturing facilities because of concerns about the supply chain. Recently, the EU decided to introduce the world's first Carbon Border Adjustment Mechanism (CBAM), which means that companies have been obligated to report on carbon emission volumes since October 2023, and from 2026, actual taxation is scheduled to begin in keeping with emission volumes. With this in mind, countries around the world are being pressed to accommodate decarbonization. In response to all this, we believe that rather than importing gray ammonia from outside of the EU,

manufacturing green ammonia within the EU offers greater potential to hedge supply chain risks and meet demand for decarbonization. We are promoting the active introduction of on-site ammonia manufacturing facilities and the realization of a carbon free society, not only in Japan but around the world.

■ About Tsubame BHB (https://tsubame-bhb.co.jp/)

Tsubame BHB is a deep tech company with a Vision of “tackling social issues, including environmental and food problems, using our unique state-of-the-art technologies.” Its goal is to contribute to the on-site production of ammonia at small-scale, distributed plants, using technologies that synthesize ammonia at low pressures and low temperatures. Established in 2017, Tsubame BHB utilizes electride catalyst technologies developed by Tokyo Tech’s Professor Emeritus Hosono, and is currently strengthening the overseas deployment of these technologies, mainly in North and South America, Australia, and Africa. In 2023, the company was invited by the Japanese government to set up a booth at the COP28 UN Climate Change Conference in Dubai. We are the only Japanese company to have been selected for the Startup Scale Program in Germany in 2024, and we are currently promoting collaborations with companies mainly in the EU.

Company overview

Name: Tsubame BHB Co., Ltd.
Representative Director and CEO: Koji Nakamura
URL: https://tsubame-bhb.co.jp/
Head office: 2-3-12 Shin-Yokohama, Kohoku-ku, Yokohama, Kanagawa Pref.
Shin-Yokohama Square Building, 6F
Established: April 2017
Outline of business:

- R&D, sales, and facilities maintenance related to on-site ammonia supply systems
- R&D, manufacturing, and sales involving synthetic ammonia catalysts
- Manufacturing and sales of ammonia and ammonia-related products

Inquiries
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