

July 5, 2019

NGK SPARK PLUG CO., LTD.
 Mitsubishi Hitachi Power Systems, Ltd.

**NGK SPARK PLUG and Mitsubishi Hitachi Power Systems Conclude
 an Agreement for the establishment of a Joint Venture
 to Manufacture and Sell Fuel high-performance Cell Stacks**

Nagoya and Yokohama, July 5, 2019 – NGK SPARK PLUG CO., LTD. (NTK) and Mitsubishi Hitachi Power Systems, Ltd. (MHPS) have concluded an agreement regarding establishment of a joint venture and the operation of a company to manufacture and sell cylindrical cell stacks¹ as the power generating elements found in solid oxide fuel cells (SOFC)².

Fuel cells are widely expected to be utilized as clean energy devices for commercial and industrial use, and are considered a solution for future energy and environmental issues.

NTK and MHPS concluded a business partnership agreement in June 2014 for the mass production of cylindrical cell stacks, and of recent time, have been pursuing joint development. The integration of NTK’s mass production technologies for ceramics and MHPS’ cylindrical cell stack design technologies, which allow for long life and heat utilization, has resulted in the commercial development of high-performance cylindrical cell stacks.

Going forward, NTK will establish a preparatory company, with a joint venture company to be established following examination by competition authorities.

□ Outline of the JV Company (Planned)

The two companies are currently in discussions for the joint venture. The following is the structure being considered at present.

(1) Name	TBD
(2) Location	Komaki, Aichi Prefecture
(3) Representative	TBD
(4) Description of Business	Manufacture and sale of cylindrical horizontal-stripe cell stacks
(5) Capitalization	300 million yen
(6) Investment Ratio	NTK 70%, MHPS 30%
(7) Start of Business	October 1, 2019

Notes

1. Cylindrical fuel stacks are structures of elements (laminated of fuel electrodes, electrolytes, and air electrodes) on the outer surface of a high-strength ceramic substrate tube, which produce a power-generating reaction. The elements are serially connected by a conductive ceramic interconnector (cylindrical horizontal-stripe cell stack), allowing for efficient generation of low current, high voltage electricity.
2. Solid oxide fuel cells (SOFC) generate electricity using oxygen (O₂) from the air, along with hydrogen (H₂) and carbon monoxide (CO) extracted from reformed town gas or other sources. The cell stacks that are the core component for power generation are composed entirely of ceramic.

□ Joint venture signing ceremony



Left side: NTK President & Chief Operating Officer Takeshi Kawai
Right side: MHPS Executive Vice President Taiji Yoshida

About NGK SPARK PLUG CO., LTD.

NTK is a general manufacturer of ceramic products, established in 1936 and headquartered in Nagoya. It holds the world's top market share in spark plugs for internal combustion engines and exhaust gas oxygen sensors, and offers a wide range of products including semiconductor packages, machine tools, bioceramics used in medical devices, and industrial-use ceramics. NTK has sales and manufacturing locations worldwide, with more than 15,000 employees working to provide new levels of value to global customers. Currently, the company is focusing on product development in such areas as environmental energy for a sustainable society, next-generation automobiles, and health care. Going forward, NTK will continue to pursue reform and new challenges with the aim of "Number One and Only One Manufacturing." For more information, visit the NTK website at <https://www.ngkntk.co.jp/english/>.

About Mitsubishi Hitachi Power Systems, Ltd. (MHPS)

Mitsubishi Hitachi Power Systems, Ltd. (MHPS), headquartered in Yokohama, Japan, is a joint venture formed in February 2014 by Mitsubishi Heavy Industries, Ltd. and Hitachi, Ltd. integrating their operations in thermal power generation systems and other related businesses. MHPS today ranks among the world's leading suppliers of equipment and services to the power generation market, backed by 100 billion yen in capital and approximately 20,000 employees worldwide. The Company's products include GTCC (gas turbine combined-cycle) and IGCC (integrated coal gasification combined-cycle) power plants, gas/coal/oil-fired (steam) power plants, boilers, generators, gas and steam turbines, geothermal power plants, AQCS (air quality control systems), power plant peripheral equipment and solid-oxide fuel cells (SOFC). For more information, please visit the Company's website at <https://www.mhps.com>

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