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NAGASE & CO., LTD.
Material Solutions Center, Tohoku University
Advanced Institute for Materials Research, Tohoku University
Institute of Fluid Science, Tohoku University

NAGASE to Commercialize World-First Technology, Developed Jointly With Tohoku University

NAGASE & CO., LTD. (Tokyo; Kenji Asakura, representative director and president) and Prof. Seiji Samukawa of Tohoku University have announced the development of the world's first water-repellency control via a combination of new technology and a hyperfine-processed nano structure. NAGASE and Prof. Samukawa developed this technology in joint research with Litho Tech Japan Corporation (Kawaguchi City, Saitama Prefecture; Youichi Minami, president and CEO) and SPP Technologies Co., Ltd. (Tokyo; Toshihiro Hayami, president). NAGASE will be responsible for commercializing the new technology.

Through a combination of ferritin, a material for which NAGASE technology allows mass production, and water-repellency control, created through a hyperfine-processed nano structure, any material can be treated for water repellency offering a permanent water repellent solution more durability than traditional coating films.

This newly announced technology is the first in the world to successfully control the surface wettability (degree that liquid attaches to a solid surface) of any material, including glass and silicone. A variety of industries have expressed interest in this technology for use in vehicle sensor and smartphone camera lenses, electronics components, commercial parts, and other applications. In particular, the market for sensors used in self-driving vehicles and safety applications is expected to reach ¥1.7 trillion^{*1} by the year 2020, 1.9 times 2017 levels. Further, smartphone unit shipments in 2020 are expected to grow 1.1 times compared to 2017, reaching 1.6 billion units^{*2}. NAGASE will target these markets mainly for the commercialization of this new technology.

To date, durability in the control of water repellency through general coatings has been an issue, as the water-repellent layer erodes after extended use. This new technology integrates NAGASE's biotemplate technology and neutral particle beam processing technology to create a nanopillar structure on the surface of glass and other materials, allowing for nano-order scale uniform processing on the surface of materials difficult to treat until now. In this way, water repellency can be controlled on any material freely, offering permanent water repellency.

NAGASE will commercialize this technology supported by the mass production of ferritin, which offers a unique structure and application formula based on unique biotemplate technologies that serve as the foundation of this

newly announced technology.

■What is ferritin?

Ferritin is a spherical protein shell produced in vivo in all living organisms. Ferritin is deeply involved in the regulation of iron ion concentration within the body. In animals, ferritin is approximately 12nm in circumference, containing not only iron ions, but also a variety of other metal ions and organic molecules. Numerous scientists are conducting research into electronic devices, medical applications, and environmental applications to take advantage of the properties of ferritin.

The NAGASE R&D Center developed a technology for the mass production of ferritin based on independent recombinant DNA technologies developed over many years, securing a patent for ferritin mass production in 2016.

■NAGASE R&D Center

The Nagase Group considers trading to be one of a number of group functions that include trading, R&D, investment, logistics, global network, and manufacturing. The group creates businesses through the integration of these functions. The NAGASE R&D Center supports the group's bio-related businesses from the research stage.

*1 Yano Research Institute Ltd. survey

*2 IHS Technology survey

◆Inquiries

NAGASE & CO., LTD. URL : <https://www.nagase.co.jp/>

Commercial Inquiries

Electronics Segment, Electronic Materials Department

TEL : 03-3665-3218 FAX : 03-3665-3849

URL : <https://www.nagase.co.jp/enterprise/electronics-dept/>

Media Inquiries

NAGASE & CO., LTD. Corporate Administration Division, Corporate Planning Department

TEL : 03-3665-3640 FAX : 03-3665-3135