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Japan Material Technologies Corporation

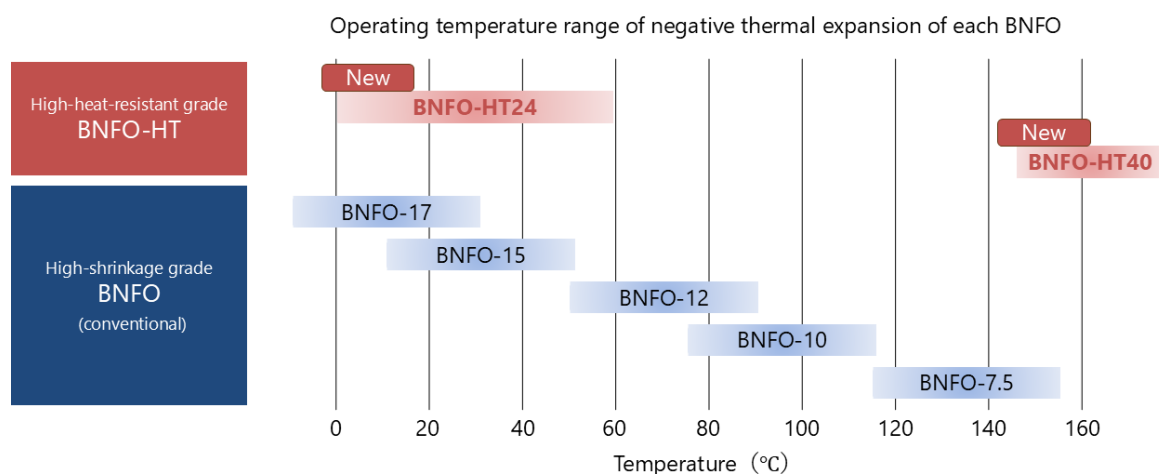
Successful Mass Production and Expansion of High-Heat-Resistant Grade for Negative Thermal Expansion Material BNFO

Establishment of Production System with an Annual Production Capacity of Over 1 Ton, Enabling Application to High-Temperature Processes

Japan Material Technologies Corporation (Head Office: Chuo-ku, Tokyo; President: Koyu Urata; “JMTC”) is pleased to announce the successful mass production of over 1 ton annually of its negative thermal expansion (NTE) material BNFO, along with the development of a new high-heat-resistant grade, BNFO-HT. This advancement to BNFO-HT enables the application of BNFO to a wide range of industrial uses involving high-temperature processes.

BNFO ($\text{BiNi}_{1-x}\text{Fe}_x\text{O}_3$: bismuth nickel iron oxide) is a groundbreaking material that exhibits significant negative thermal expansion (shrinking as temperature rises) within its phase transition temperature range, in contrast to conventional materials that expand when temperature increases. In many industrial fields, including electronic components, thermal expansion due to heat generation has posed challenges to product reliability, but there have been few materials available to control such expansion. BNFO offers a promising solution to this issue and is expected to be used in diverse applications such as precision resin-molded parts, conductive pastes, and adhesives.

Through scale-up efforts, JMTC has established a production system capable of producing more than 1 ton of BNFO annually. Furthermore, JMTC has developed high-heat-resistant grades surpassing conventional products in heat resistance and capable of withstanding environments exceeding 400 °C: BNFO-HT24 (NTE temperature range: approx. 0–60 °C) and BNFO-HT40 (NTE temperature range: approx. 150–180 °C). These developments enable application of BNFO in high-temperature melt-kneading processes for engineering plastics and thermoplastic resins.



This material is based on inventions by Professor Masaki Azuma and his team at the Institute of Science Tokyo. JMTC has been working under a joint research agreement with the Institute of Science Tokyo and the Kanagawa Institute of Industrial Science and Technology (KISTEC) to develop industrial manufacturing processes. Moreover, since FY2022, JMTC has been working to scale up, expand the product lineup, and develop new applications under the “Go-Tech Program”, a grant program by the Ministry of Economy, Trade and Industry (METI). This current achievement represents part of these outcomes.

Going forward, JMTC will continue to expand the industrial applications of negative thermal expansion materials by further advancing mass production technologies, developing new grades tailored to customer needs, and exploring new applications.