BNFO negative thermal expansion material

– $BiNi_{1-x}Fe_xO_3$ (bismuth · nickel · iron oxide) –

Product Oxide ceramic material showing negative thermal expansion

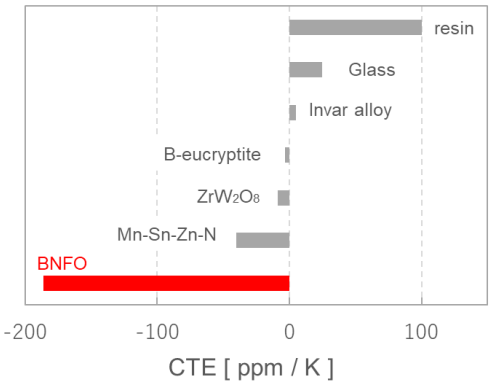
Application Joining component for dissimilar materials, precision processing component

Feature Greater negative thermal expansion (-187 ppm/K)

Feature :

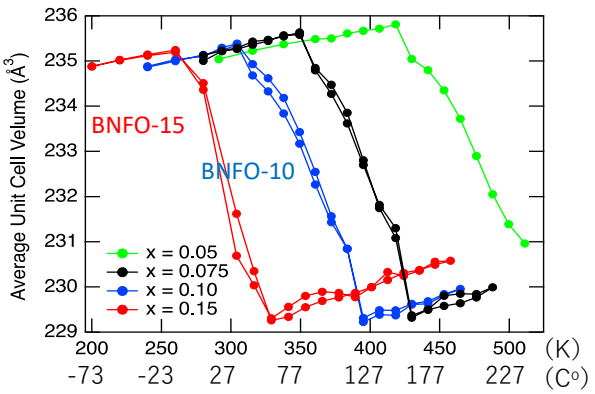
Greater negative CTE

Controls thermal expansion in small amount



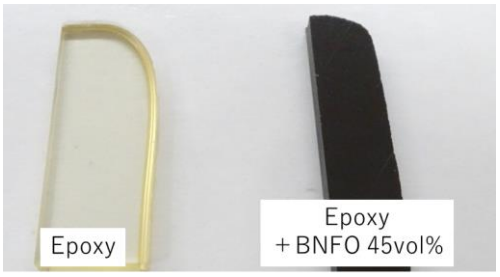
Selective operating temp.

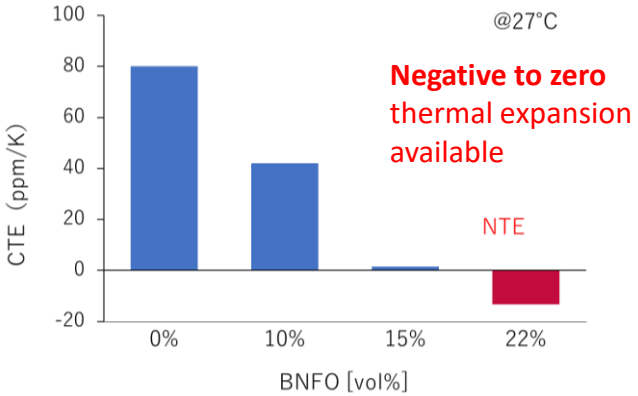
2.6% of volumetric continuous shrinkage



Compositable

High compatibility with resin

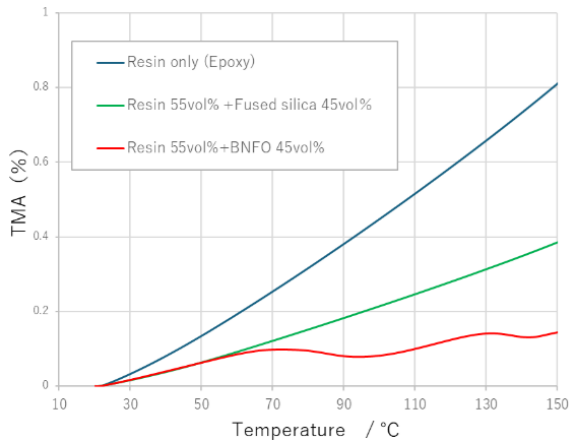




Application :

《ex》 Epoxy-BNFO composite

Mixture of phase transition @ 70, 95 and 135 °C



Greater thermal expansion suppression effect.

- ◆ Improved dimensional accuracy
- ◆ Warp prevention
- ◆ Offsets resin expansion

Precision components

Dimensional accuracy

Precision Adhesives

Less warping, less filler additions

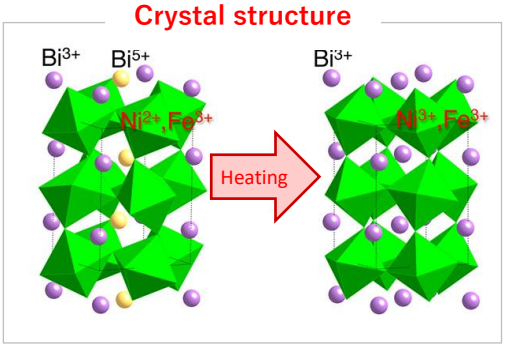
Conductive paste

Stability in high temperature

BACK-GROUND

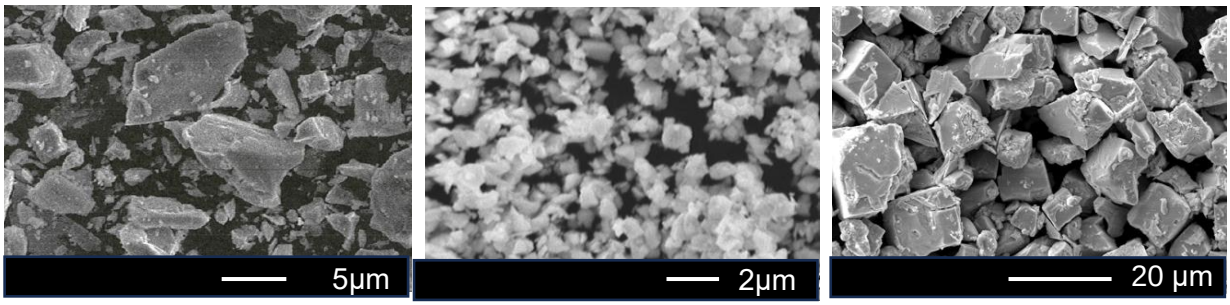
$BiNi_{1-x}Fe_xO_3$ (bismuth · nickel · iron oxide) "BNFO" was developed by team of Prof. Masaki Azuma, Science Tokyo (former Tokyo Institute of Technology). JMTC has concluded a joint R&D agreement with the team (Science Tokyo and Kanagawa Institute of Industrial Science and Technology) and is promoting commercialization of BNFO.

PRODUCT OVERVIEW



BNFO is oxide ceramic material with a perovskite structure and exhibits a negative linear coefficient of thermal expansion (-187ppm/K). It is expected to be used as filler to reduce CTE (coefficient of thermal expansion) or as material for sensor.

SEM



D(50) ≒ 5 μm

※Various particle types are under development

Properties

Hardness*	2.5 [GPa]
Specific gravity*	9.04
Resistivity(RT/ 100°C)*	5.04 / 0.03 [Ω・cm]
Dielectric constant/Loss tangent (1 MHz)*	1060 / 0.05
Dielectric constant/Loss tangent (10 MHz)*	118 /1.25
Dielectric constant/Loss tangent (5.8 GHz)**	71.6 / 0.19

*Measured value of BNFO-15 bulk , not guaranteed

**Measured value of BNFO-10 filler, not guaranteed

Contact information

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