

News Release

Fine particles for a fine future.



TODA KOGYO CORP.

June 30, 2024

Awarded the “Noboru Ichinose Award” for “Synthesis and Control of Barium Titanate Fine Particles”

TODA KOGYO CORP. (TSE: 4100, hereafter, “the Company”) announces receiving the 6th “Noboru Ichinose Award,” hosted by the Electronic Ceramic Process Meeting. The “Noboru Ichinose Award” commemorates Professor Noboru Ichinose, who served as a professor for many years at Waseda University where he made significant academic contributions through numerous publications on ceramics, dielectrics, and piezoelectric materials. This prestigious award recognizes engineers and researchers who have made outstanding contributions to “process technologies in electronic ceramics.”

The Company is honored with this award for its contribution to solving the challenge of producing highly crystalline fine particles of barium titanate (BTO), a material used in multilayer ceramic capacitors (MLCCs). By developing a hydrothermal synthesis process, the Company succeeded in synthesizing small size with highly crystalline particle, thereby contributing to the advancement of this technology.

Summary

Awarded Title: “Synthesis and Control of Barium Titanate Fine Particles”

Awarded Recipient: Haruki Kurokawa, Ryuji Fujita, Hidetomo Unemoto,
Takamoto Kawaguchi, Seiji Okazaki

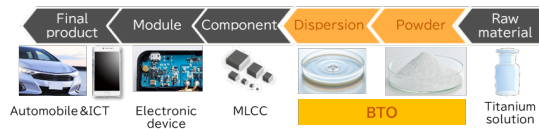
Background of the Development:

MLCCs, in which BTO is primarily used, are key passive components that maximize the performance of semiconductors in current electronic devices.

Controlling the properties of BTO to fully optimize the performance of these components is critical in the electronic components industry. In response to this challenge, the Company successfully developed highly crystalline fine particles with uniform shape and size by controlling the nucleation and growth of BTO particles. This was accomplished using a hydrothermal synthesis process.

Market Needs and Supply Chain

- Expansion of high-performance communication needs driven by xEVs, 5G/6G, and AI servers
- Growth in demand for high-capacity, high-speed, high-reliability semiconductors
- Rising demand for compact, high-capacity MLCCs

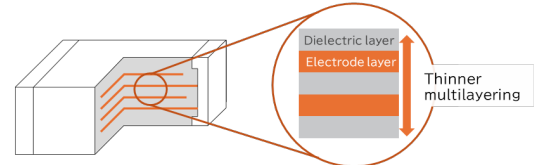


Structure

- Multilayer structure composed of a dielectric layers (main material: BTO) and internal electrode layers (main material: nickel)

Needs

- Thinner and multilayered structure for achieving compact, high-capacity design
- Uniform shape and size of BTO particles

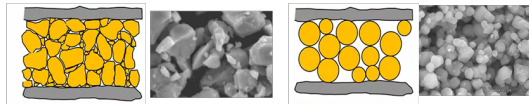


Challenges

Low MLCC Reliability

(Causes)

- Variability in the shape and size of BTO particles
- Low crystallinity due to miniaturization of BTO particles

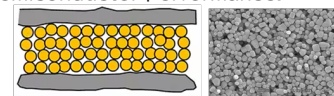


Structural image and electron microscope image of BTO

Award-Winning Research

Contributing to solving key challenges

Developed highly crystalline BTO fine particles with uniform shape and size by hydrothermal synthesis. Enabled thinning and multilayering of MLCCs, enhancing semiconductor performance.



Structural image and electron microscope image of BTO

Award Ceremony Scene



From left Dr. Nakahira, President of the Electronic Ceramics Process Meeting
Dr. Kurokawa, TODA KOGYO CORP.

Future Developments

The Company aims to further expand its business in the electronic components sector —primarily for MLCCs as dielectric materials— by supplying highly crystalline BTO fine particles with uniform shape and size. These particles can be mass-produced using a hydrothermal synthesis process. Furthermore, leveraging the characteristics of these fine particles —high crystallinity, high dielectric constant, high refractive index, and excellent light transmittance— the Company also seeks to enter the optical materials field.

- Expansion of the BTO fine particles product lineups
- Increase in production capacity to meet strong demand
- Development of business in the optical field

Going forward, guided by the purpose *“We transform the potential of fine particles into new possibilities for our world.”*, the Company will continue to create new value by developing innovative materials and providing solutions that harness the power of fine particles to address future challenges, striving to remain a company that supports a diverse and evolving society.

Reference

Company Website: Dielectric Materials Overview Page

<https://www.todakogyo.co.jp/english/product/dielectric.html>

Media contacts

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