Technologies to Products…On the Leading Edge

NanOxide™ HPB-4000
400 nm Barium Titanate

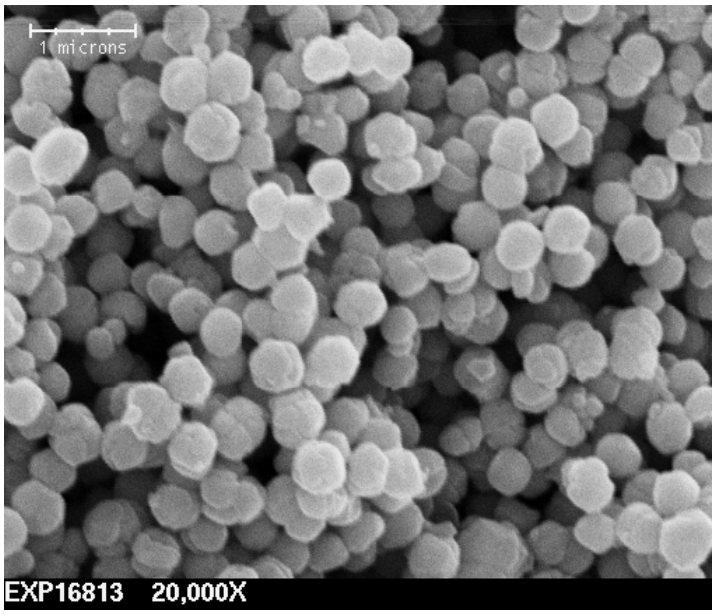
TPL's NanOxide™ HPB series is a chemically precipitated high purity barium titanate nano-sized powder designed to meet a variety of demanding electronics applications. HPB high purity barium titanates are some of the smallest powders produced ranging from 50 nanometers to 400 nanometers with extremely tight distributions of particle size.

It is recommended for dielectric applications in the form of ceramic tapes, monolithic capacitors, and composites.

Typical Properties

HPB-4000 is a crystallographically cubic phase, pure barium titanate.

Specific Surface Area	4 m^2/g
Nominal Size (BET)	400 nm
Loss On Ignition	<1.5%
PH (ASTM - D1208)	9.0-11.0
Chemical Analysis	
Ba:Ti (XRF)	0.995-1.005
SrO (ICP)	<0.1%
CaO (ICP)	<10 ppm
MgO (ICP)	<10 ppm
SiO_2 (ICP)	<200 ppm
Al_2O_3 (ICP)	<100 ppm
Fe_2O_3 (ICP)	<10 ppm
$BaTiO_3$	>99.5%



Applications

HPB-4000 is finding use in multilayer ceramic capacitors (MLCC), monolithic ceramic capacitors, polymer-ceramic composites, electrode pastes, and piezoelectric applications.

Processing

When introducing HPB-4000 into your process, please keep the following points in mind:

- The manufacturing process for barium titanate includes a drying step which can induce soft agglomeration (roughly 75 micron size particles). These agglomerates are easily broken up by ultrasonication or ball milling.
- Some harder agglomerates will also exist in the powder particles. Because of the extremely fine particle size, these agglomerates require more energy than is traditionally required for larger, micron sized particles. In other words, when switching from micron sized powder to nano-sized powder it may be necessary to lengthen ball milling time by a factor of two or three.
- Because of the extremely high surface area, higher surfactant concentrations are typically necessary to disperse nano-sized barium titanate relative to micron sized powder.

TPL, Inc. markets a formulated dispersing agent, NanoSperse™ 484, specifically designed to enhance dispersion of NanOxide™ ceramic powders in both aqueous and organic solvents.

TPL, Inc. has considerable experience with slurry production, tape cast compositions, composite formulations, dry pressing and firing operations and can assist in determining a process for your application.

For more information, contact:
Trista Mosman
Director of Admin and Marketing
TPL, Inc.
3921 Academy Parkway North, NE
Albuquerque, NM 87109
Phone: (505) 342-4439
Fax: (505) 343-1797
tmosman@tplinc.com