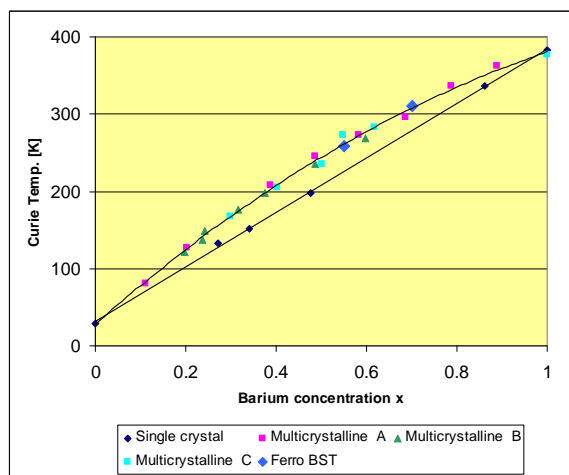


## Barium Strontium Titanate (BST) Additive/Dielectric Material

**Description:** BST (Barium Strontium Titanate) is a multi-component single phase material with a Curie peak that can be moved by modifying the barium to strontium ratio. These different ratios allow a wide variation of properties for applications like:

- Filled polymers
- Microwave components
- Implanted medical devices
- Aerospace components
- Standard capacitors



Curie temperature of Ferro BSTs with different  $Ba_xSr_{1-x}TiO_3$  (from literature).

### Processing Information for Fired Applications:

Firing temperature      1340°C for 2 hours  
 Setter selection          Zirconia  
 Composition                Pb and Cd Free

### Typical Physical Properties:

For  $Ba_{0.55}Sr_{0.45}TiO_3$   
 Particle Size ( $\mu m$ )

D10 (Horiba)                0.66  
 D50 (Horiba)                1.44  
 D90 (Horiba)                3.81  
 Surface area ( $m^2/g$ )        1.87

These properties can be manipulated to make the powder coarser or finer depending on customer requirements. The (Ba/Sr)/Ti ratio can be fine tuned to offer optimum performance in the respective application as well.

### Typical Electrical Properties:

For  $Ba_{0.55}Sr_{0.45}TiO_3$ , based on Ferro fired disc measurements.

Dielectric Constant, K            2367  
 (@ 25°C, 1 kHz)  
 DF (%) @ 1 kHz                    0.19  
 DF (%) @ 1 MHz                    0.09  
 Curie Point (°C)                    -15  
 K @ Curie Point                    5717  
 DF 1 kHz @ Curie Point            0

Ba/Sr mole ratio	Ba55/Sr45	Ba70/Sr30	Ba70/Sr30
(Ba+Sr)/Ti mole ratio	0.990	1.000	0.998
D10 [ $\mu m$ ]	0.66	0.36	1.02
D50 [ $\mu m$ ]	1.44	0.59	2.65
D90 [ $\mu m$ ]	3.81	1.10	4.92
SSA [ $m^2/g$ ]	1.87	6.39	1.17
K at 10% in PC	85	81	95
K dispersed BST	1131	707	3499

Properties of experimental BST powders

The numbers shown for 10% dispersion in 90% propylenecarbonate (PC, K=64) are measured with a HP fluid cell and an Agilent 4284A impedance analyzer at 1 MHz. K of the dispersed particles is calculated according to the original Lichtenecker formula:

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$$\log K = v_1 \log K_1 + v_2 \log K_2$$

where  $v_1$  and  $v_2$  = PC and BST volume fractions and  $K_1$  and  $K_2$  = PC and BST K values.

BST shows promise in a number of potential applications ranging from filled polymer to targeted fired medical applications. A number of advantages of this material are observed because it is a single phase material

that offers properties beyond the mixing of various barium and strontium titanates. These translate into potential unique application areas especially for high frequency applications.

**Storage:** Store at room temperature in original, unopened containers. When properly stored, unopened material will have a shelf life of 5 years.

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