

## Synthesis of barium titanate ( $\text{BaTiO}_3$ ) nanoparticles by hydrothermal method using supercritical water

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Barium titanate is the useful materia in electrical industries for its outstanding dielectric permittivity and ferroelectric properties. Thus, barium titante has been widely used in various applications such as electro-optic device, D-ram, thermister, multi-layer ceramic capacitor (MLCCs). Especially, in MLCCs industries, barium titanate nanoparticles with the narrow size distribution can achieve reduceing dielectric layer thickness of MLCCs and producing MLCCs with high capacitance in a small volume.

In this study, barium titanate nanoparticles were synthesized by a hydrothermal method using supercritical water.  $\text{Ba}(\text{OH})_2$  and  $\text{TiO}_2$ (anatase)were used as starting materials, and the reaction was carried out at  $400^\circ\text{C}$  and 300 bar. To increase conversion of anatase, the reaction time and the initial molar ratio of Ba/Ti was varied. Adding KOH enhanced purity of the product. When amorphous titanium dioxide was used as Ti resource, all of titanium dioxide was converted to barium titanate without addition of  $\text{OH}^-$  source, and the nanoparticles (~50nm) could be obtained without a stabilizer.