

Synthesis of BaTiO₃ nanoparticles and dissolution-precipitation mechanism

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Barium titanate is important material in electronics industry due to it has outstanding dielectric, ferroelectric, and piezoelectric property. Hydrothermal synthesis is one of the most promising processes to produce barium titanate nanoparticles owing to its simplicity and monodispersity of product. Two major formation mechanisms in hydrothermal synthesis were suggested as followed; dissolution-precipitation and in-situ transformation. In this study, formation mechanism of barium titanate was investigated. Three kinds of titanium precursors were used to synthesize barium titanate. From our results, dissolution-precipitation mechanism was selected as the formation mechanism. Further, it was observed that size of barium titanate nanoparticles is controlled by specific surface area of titanium precursor due to low solubility of titanium dioxide.