

## **Influence of milling conditions on the mechanochemical synthesis of CaTiO<sub>3</sub> nanoparticles**

### **Abstract**

The mechanochemical synthesis of calcium titanate (CaTiO<sub>3</sub>), was carried out in a planetary mill by varying the milling time and mill rotational speed at three levels. CaCO<sub>3</sub> and TiO<sub>2</sub> were used as the starting materials. Besides size reduction, the CaCO<sub>3</sub>/TiO<sub>2</sub> mixture had undergone structural changes, which was affected by the process parameters of the planetary mill. Furthermore, milled particles in a nanometer size range were aggregated to form micron size particles. The CaTiO<sub>3</sub> phase was formed when the milling time was set at 5 h, and the mill rotational speed was 600 rpm. The mechanochemical process was affected by the mechanism inside the vial, such as the shock power and friction component, at high efficient milling region. The particle size of the CaTiO<sub>3</sub> has a diameter of about 10.3 nm. The parameters used affected the degree of crystallinity, crystallite size and lattice strain of the particles.

**Keywords** — Mechanochemical processing, high-energy ball milling, x-ray diffraction.