

Hydrothermal Synthesis of 1-D ferroelectric perovskite materials on substrate

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Barium titanate and lead titanate is representative famous ferroelectric materials. In particular, one-dimensional (1-D) ferroelectric nanomaterials on substrates are of great interest because of their peculiar physical properties of large surface area, excellent charge transport and outstanding ferroelectric properties. The research of 1-dimensional ferroelectric materials is progressing because they are applicable to various fields.

We synthesized BaTiO_3 on FTO glass and PbTiO_3 nanowires on Ti substrates. In case of BaTiO_3 nanowires, we utilized the TiO_2 nanoparticles thin film from spray coating and $\text{Ba}(\text{OH})_2$ under strong alkaline condition using ammonia. we synthesized vertical aligned PbTiO_3 nanowire array on Ti substrate with high aspect ratio via hydrothermally breaking the TiO_2 nanotubes which was fabricated by anodic oxidation of Ti foil.

The as-obtained nanowires were characterized by transmission electron microscopy (TEM), scanning electron microscopy (SEM), synchrotron X-ray diffraction, X-ray photoelectron spectroscopy (XPS) and EXAFS. And we also investigated capacitance and piezoforce properties.