Poster Presentation

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Investigation of tetragonal-cubic transition of barium titanate

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Barium titanate BaTiO3 is a dielectric ceramic material widely used for capacitors in electronic circuits. The BaTiO3 has been intensively studied because of its excellent ferroelectric properties at ambient conditions. It is known that BaTiO3 is in ferroelectric tetragonal phase at room temperature, and it undergoes a phase transition to paraelectric cubic phase at about 120-130°C. The ferroelectric transition of BaTiO3 is considered to be of the displacement type. However, some recent studies have proposed that it may have a character of the order-disorder type [1]. We have investigated the detail of the change in the powder diffraction pattern at the tetragonal-cubic phase transition. The diffraction patterns on elevating temperature were recorded with two-dimensional X-ray detectors on the beam line BL5S2 at synchrotron facility AichiSR. We also collected the diffraction patterns on the stepwise variation of the temperature with a powder diffraction measurement system (PANalytical, X'Pert PRO MTD). Fig.1 is a color scale view of the diffraction intensity. longitudinal axis and horizontal axis respectively correspond temperature and diffraction angle. It shows the change of powder diffraction pattern of the {400}-reflection indexed by pseudo-cubic system. The diffraction pattern (periodic structure) appears to change continuously on the tetragonal-cubic phase transition. Details about the analysis will be presented at the conference.

[1] Tsuda, K. (2016) Appl. Phys. Express 9, 071501.

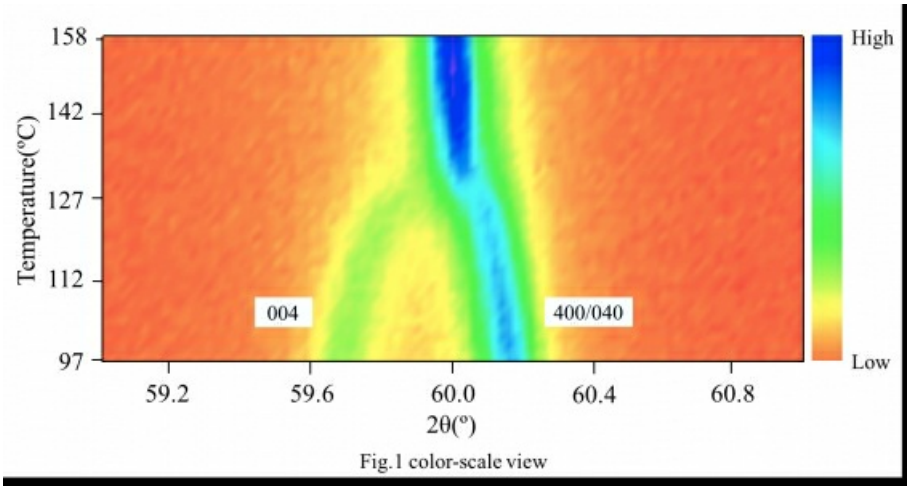

Fig.1 color-scale view

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