Highly Nitrogen Doped SrTiO3 Thin Films using Reactive Magnetron Sputtering

Jedeok Kim [1,*] and Itaru Honma [2]

(1) Environmental Circulation Composite Materials Group, Functional Materials Field, Research Center for Electronic and Optical Materials, National Institute for Materials Science (NIMS), 1-1 Namiki, Tsukuba, Ibaraki, 305-0044, JAPAN
(2) National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1 Umezono, Tsukuba, Ibaraki, 305-8568, JAPAN

e-mail: Kim.Jedeok@nim.go.jp

Global warming requires the development of environmentally friendly science and technology and the creation of business. In recent years, research into clean energy device materials that can obtain safe energy by utilizing natural energy such as sunlight has become active.

Wide-gap semiconductor, TiO_2 and $SrTiO_3$ (STO), can be doped with various elements (C, N, F, P, S, Li, Na, K, Mg, Ca, Ba, etc.) for photocatalytic applications [1]. In addition, visible light of sunlight can be effectively utilized [2,3].

In this study, we report on the properties of highly nitrogen doped STO (HSTO) films. The films were deposited by RF magnetron sputtering on quartz or Pt/quartz substrates in a nitrogen atmosphere using an STO target. As a result, NSTO with a nitrogen concentration of 9.5 atom% was obtained (Fig. 1), and the band gap decreased from 3.5 eV of STO to 1.9 eV. The perovskite structure was maintained, and optical properties were obtained in the visible light region.

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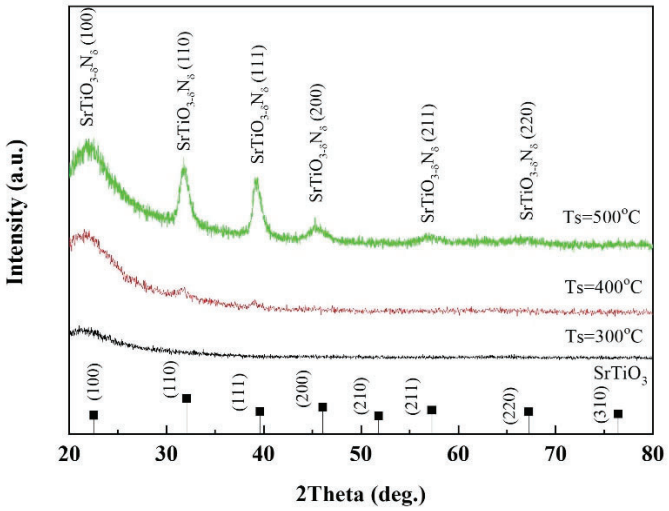

Fig. 1 XRD properties of NSTO films deposited at the different temperatures.