

Transparent conductive $\text{Ti}_{1-x}\text{Nb}_x\text{O}_2$ polycrystalline films on glass substrates fabricated via crystallization of amorphous phase grown by pulsed laser deposition

Taro Hitosugi (1, 2, *), Atsuki Ueda(1), Shoichiro Nakao (2), Naoomi Yamada(2), Yutaka Furubayashi (2), Yasushi Hirose(2), Toshihiro Shimada(1, 2) and Tetsuya Hasegawa(1, 2)

1 Department of Chemistry, University of Tokyo, Japan

2 Kanagawa Academy of Science and Technology (KAST), Japan

Nb-doped anatase TiO_2 ($\text{Ti}_{0.94}\text{Nb}_{0.06}\text{O}_2$: TNO) films with high electrical conductivity and transparency were fabricated on non-alkali glass using pulsed laser deposition and subsequent annealing in a H_2 atmosphere. The amorphous films as-deposited on unheated substrates were found to crystallize forming polycrystalline films at around 350°C . [1, 2] The films annealed at 500°C showed resistivity down to $4.6 \times 10^{-4} \Omega\text{cm}$ at room temperature, and optical transmittance of 60-80% in the visible region, which are comparable to those of ITO films. These results indicate that TNO films have the potential to be practical transparent conducting oxides that could replace indium tin oxide (ITO). In addition, we discuss electronic band structure and conduction mechanism of TNO films.

[1] T. Hitosugi *et al.*, Jpn. J. Appl. Phys. 46, L86 (2007).

[2] T. Hitosugi *et al.*, submitted to Appl. Phys. Lett.