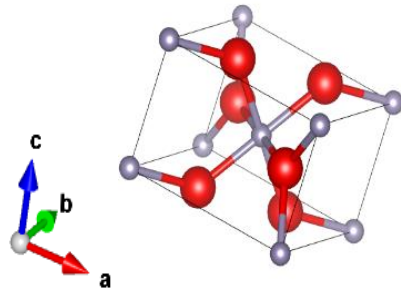


Crystal structure and physical properties of SnO_2 and SnO

SnO_2

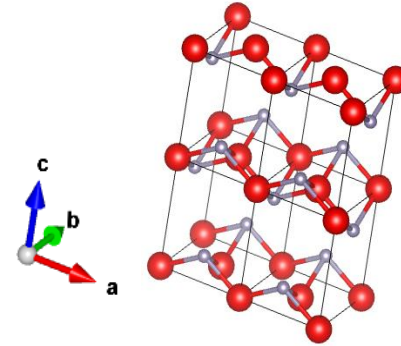


ion radius (Å)

- Sn^{4+} : 0.71
- O^{2-} : 1.32

Optical band gap
 3.57 eV (parallel)
 3.93 eV (vertical)

SnO

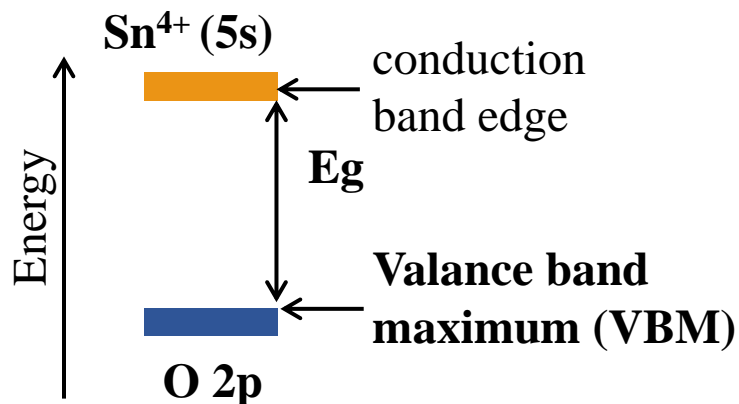


ion radius (Å)

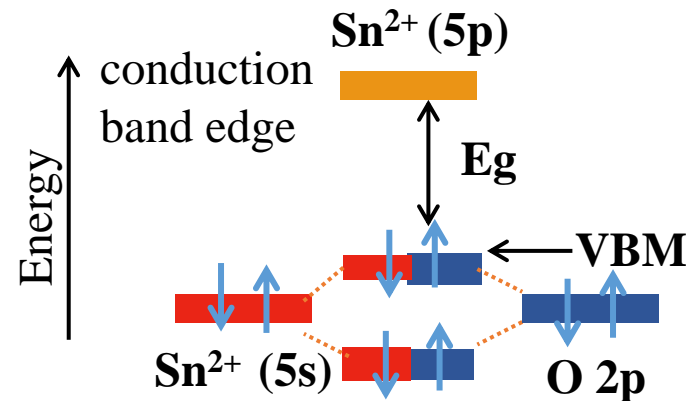
- Sn^{2+} : 0.93
- O^{2-} : 1.32

Optical band gap
 2.7 eV (direct)
 0.7 eV (indirect)

The band structure of SnO_2
 (Localized valence band orbitals)



The band structure of SnO
 (Delocalized balance band orbitals)



Result: Transmission Electron Microscopes (TEM)

Bright-field images

Dark-field images

Electron beam diffraction images

Metal

Polycrystalline pattern

Amorphous pattern + Microcrystalline pattern

Amorphous pattern

Oxide

Polycrystalline pattern

Dark-field images

SnO

SnO₂

Sputtering pressure ($\times 10^{-3}$ Torr)

Substrate temperature (T_s/T_m)

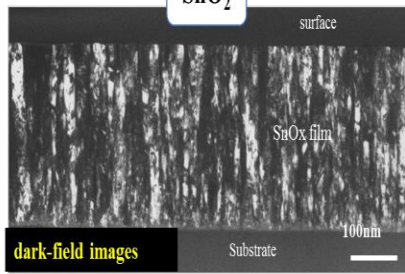
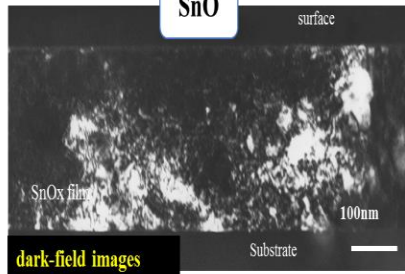
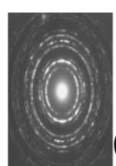
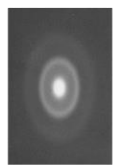
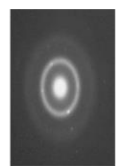
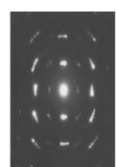
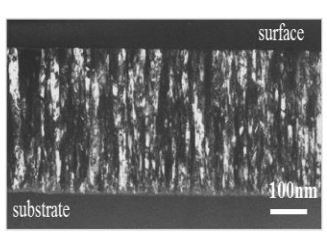
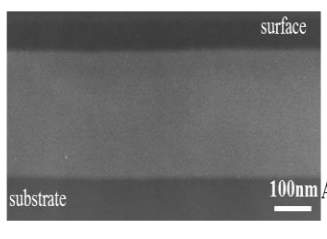
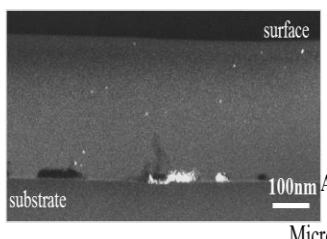
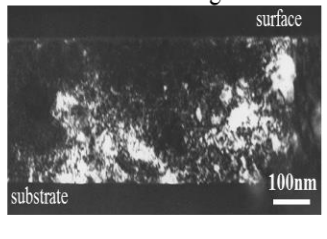
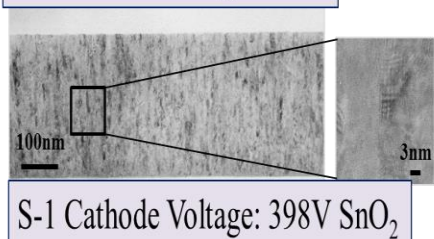
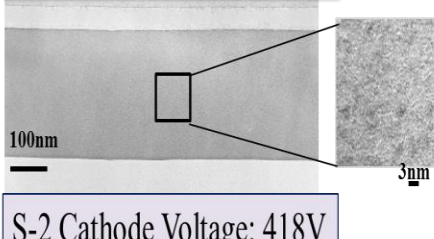
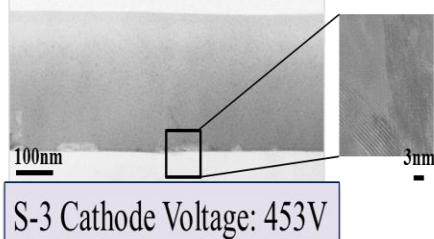
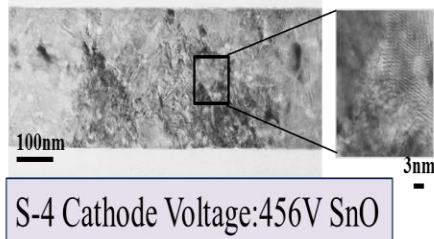
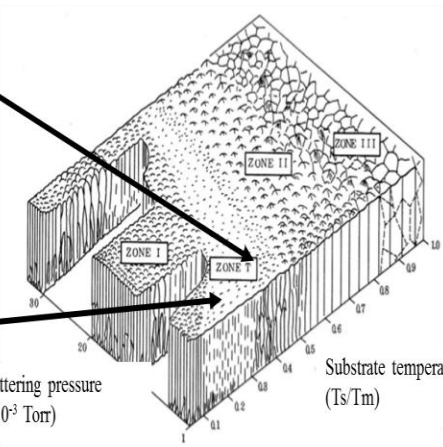


Table. Melting point of SnO_x thin films

	Melting point [K]
SnO ₂	1903 [4]
SnO	1353 [4]

Thornton model [5]

$$T_s/T_m = 0.25 \text{ Zone-I}$$

$$T_s/T_m = 0.35 \text{ Zone-II}$$