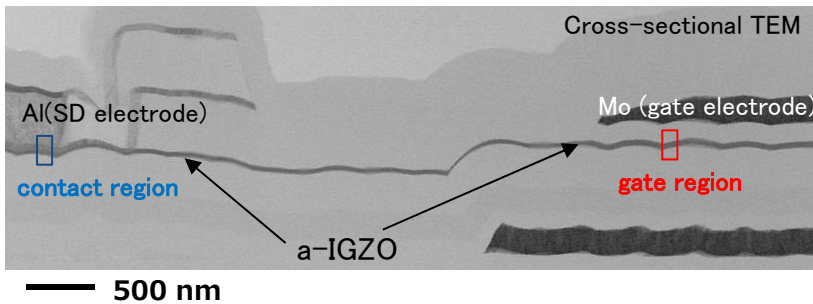


Electronic structure of a-IGZO and a-IGZO/metal interface structure in a TFT device

IGZO (InGaZnO) with high electron mobility has been used in many kinds of electronic devices. We characterized elemental composition distribution and electronic structure of a-IGZO with nano-spatial resolution to consider the roles of IGZO at different locations in a structured TFT device.

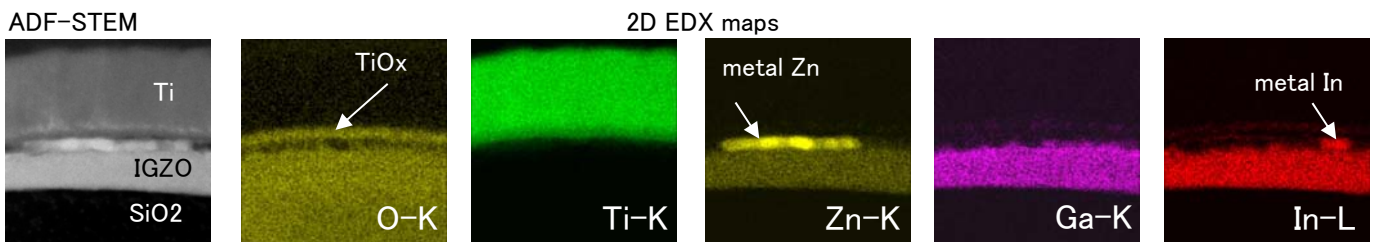
1. TFT structure of the sample



Previous SCM measurement

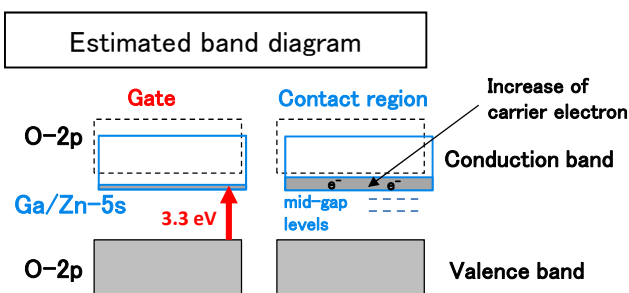
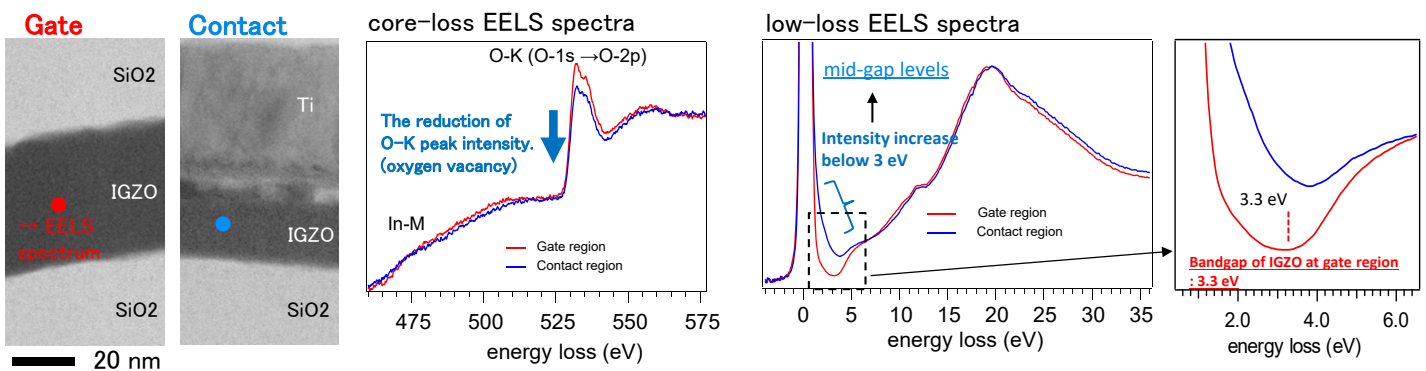
a-IGZO (50 nm thick) is n-type semiconductor and the carrier density at contact region is higher than that at the gate region.

2. Elemental composition at source (drain) metal/a-IGZO contact interface



The oxidation of Ti. Separation of Zn and In.
The metallic Zn and In at the interface ⇒ Contact resistance reduction

3. The difference of a-IGZO electronic structure between contact and gate region



At the contact region :

- Increase of carrier density by oxygen vacancy,
- Creation of mid-gap levels

→ The reduction of contact resistance between a-IGZO/metal.

The local electronic structure and electric property can be considered by STEM-EELS with nm spatial resolution.