

Theme: Electronic Material

- Sub Theme: Oxide semiconductor-based Memory Device

As current silicon technology has faced physical limits on further scaling down, novel semiconducting material such as oxide semiconductors (OS) has gained more attention to continue the ever-demanding downscaling represented by Moore's law. Amongst, OS is considered to be the most promising alternative material in memory because it has intriguing features such as modest mobility, extremely low off-current, and low-temperature processibility with conventional complementary metal-oxide semiconductor-compatible methods. However, such an OS device is necessary to develop high reliability and performance.

We are aiming to research device performance, reliability, interfaces between materials, and low electrical contact characteristics.

The topics we pursue through this GRO are as follows:

- Modeling and analysis of OS and high-k gate stack/contact.
- Pathfinding of contact, channel, and gate materials to improve device performance and reliability.
- Monolithic 3D transistors and their Memory applications
- Fundamental Research for growth and characterization of the oxide semiconductor thin film by ALD/CVD: Reaction mechanisms, in-situ measurement, defect control, modeling, theory
- New precursors and delivery systems for ALD/CVD processes

※ *The topics are not limited to the above examples and the participants are encouraged to propose the original idea.*

※ *Funding: Up to USD 150,000 per year*