SEMICONDUCTOR ENERGY LABORATORY

Development of oxide transistor evaluation and advanced LSI circuit design methodology

Background

Semiconductor Energy Laboratory (SEL) Co., Ltd., is the leading company in the development of crystalline oxide semiconductors for ultra-low power LSI applications. While high-quality, high-performance oxide transistors have been extensively demonstrated, there is a need to accelerate circuit and application development using these transistors.

Goal

The overall goal is to increase the development efficiency of LSI circuits using oxide semiconductor transistors. You will be expected to contribute to the improvement of current development processes and implement them in actual circuits.

Tasks

1. Review the literature on oxide semiconductor development workflow, circuit design methodology, and chip designs of past prototypes.
2. Identify issues specific to oxide semiconductor transistors in the current design workflow and chip designs.
3. Propose and implement improvements and evaluate their effectiveness.
4. Improve the efficiency of chip design using design and programming tools.
5. Demonstrate chips with shortened development time or chips with high efficiency using simulation tools and model chip designs.

Qualifications

- Experience of circuit design and electronic design automation (EDA) tools.
- Basic LSI circuit design and programming (Python, including machine-learning library).
- Microsoft Office
- Understanding of CMOS circuits, their limitations, and fundamental differences from oxide semiconductor circuits
- Willingness to overhaul established CMOS thinking to harness the potential of oxide semiconductors.
- Good communication skills in written and oral English, preferably also in basic conversational Japanese (English versions of tools and PCs are available).
- Good command of the latest trends in artificial intelligence (AI) and how it can be used in circuit design.

Contact information

This project is hosted by SEL. Students are invited to apply for a scholarship from SEL through the Sweden-Japan Foundation from 2024-03-15. For more information, please visit the SEL web site or contact the SEL public relations team at info@sel.co.jp.