ADVANCED DEVICES AND MATERIALS ENGINEERING (ADME)

- Professor Ts Ir Dr. Abdul Manaf Hashim, Professor (Head of iKohza)
- Dr. Rasli Abd Ghani, Senior Lecturer
- Dr. Shaharin Fadzli Abd Rahman, Senior Lecturer

NUMBER OF STUDENTS

- Ph.D: 7 students
- Master: 1 students
- Bachelor: 8 students

RESEARCH KEYWORDS

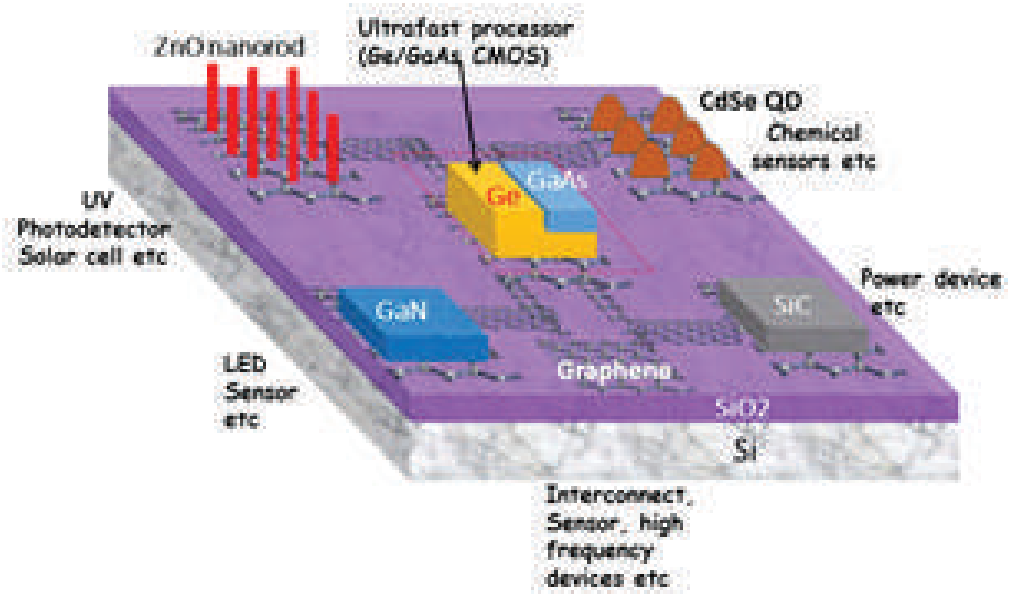
Research Keywords: Nanomaterial, sensor, functional material, nanodevice

OUTLINE OF IKOHZA

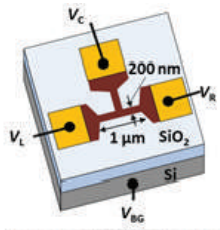
The Advanced Devices and Materials Engineering (ADME) ikohza is dedicated to conduct the R&D activities on the emerging nanomaterials, formation of nanostructures and novel micro-nanodevices for the applications in the future green electronics, and renewable and sustainable energy.

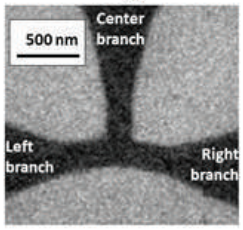
CURRENT RESEARCH

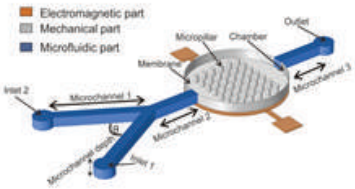
- Material Engineering Area : Synthesis/growth of carbon nanomaterials, semiconductors, organic/ molecular materials and bio-materials as well as their nanostructure formation technologies.

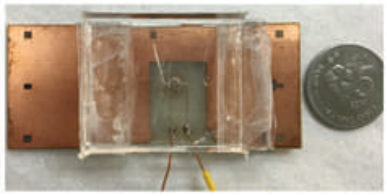


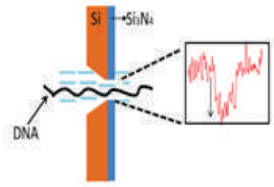
- Micro-nanodevice Area : Novel nanodevices and functional devices covering electronic/photonic devices, microfluidic devices, sensors and solar cells.
  Three-branch junction device Micromixer DNA Sensors

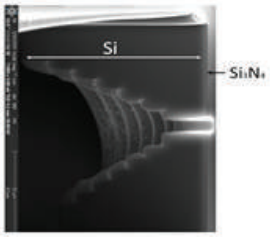












MERIT OF THE TECHNOLOGY

The performance of silicon ultra-large-scale integrated circuits (Si-ULSIs) has been enhanced over the last 30 years by increasing the number of transistors in accordance with Moore's law. The scaling rule of the Si transistor has made it possible to miniaturize the transistors in the Si-ULSIs. However, the miniaturization of the transistors becomes increasingly difficult owing to the physical limitations, and the conventional scaling rule will not be enough to enhance the performance of the Si-ULSIs. Recently, the concept of advanced heterogeneous integration on Si platform was proposed towards the realization of a so-called "More than Moore" technology. Here, semiconductor materials with superior properties are introduced on the Si platform in order to not only enhance the performance of MOS transistors but also facilitate the present Si-ULSIs with various functionalities where these materials can be used to fabricate various kinds of functional devices, such as optical devices, photodetectors, sensing devices, solar batteries, and so forth. As a next-generation technology, such intelligent system-on-chip (i-SoC) on Si is considered as a promising and practical direction. In line with this, we are developing various growth techniques of novel functional materials and investigating application to advanced devices.

POSSIBLE INDUSTRY APPLCIATION

As a premier university-based research laboratory, our lab is well-equipped with the state-of-the-art facilities for micro-nanofabrication and material/device characterization. These facilities are placed in the clean rooms with class of 1,000 and 10,000. We provide open access, hands-on-training and courses to the entire university and to external users from both academia and industry. We highly value our users and we strive to offer an excellent facility-user experience. The facility is also accessible to outside organizations on a contract or collaborative basis.

POTENTIAL COLLABORATIVE AREA:

- Development of semiconductor fabrication and processing
- Characterization and analysis of materials and devices
- Development of novel semiconductor devices

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