Plan Overview

A Data Management Plan created using HKUL DMPTool

Title: Fabrication of high-k gate stack with the application of SiC FET gate

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Template: HKU Template

Project abstract:

SiC is a third generation semiconductor having excellent physical properties suitable to fabricate high power devices. It finds applications in electric vehicles, high speed train and power grid etc to replace the conventional Si-based devices. Comparing to the Si-based devices, SiC power devices has 70 % less energy loss and 80 % smaller in system size. SiC metal oxide semiconductor field effect transistor (MOSFET) is one of the building blocks for SiC-based high power system. Low channel mobility and high interface trap density are the two current issues limiting the performance of SiC MOSFET, like the threshold voltage shift, gate layer failure and non-saturated drain current operation. The current project aims to enhance the channel mobility and suppress the interface trap density via using a high-k-Al2O3/SiO2 stack gate and defect engineering.

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Copyright information:

Fabrication of high-k gate stack with the application of SiC FET gate

Data Collection

What data will you collect or create?

Electrical measurement of the MOSFET based on the SiC;

SEM or TEM figures of the MOSFET based on the SiC. etc

How will the data be collected or created?

The experimental details will be marked down in laboratory notebooks.

Electrical measurement was mainly measured by the keitheley 2612B;

SEM or TEM figures of the MOSFET based on the SiC were collected by FEI Quanta 200 3D FIB & Thermo Scientific Talos F200X STEM. etc

Documentation and Metadata

What documentation and metadata will accompany the data?

The raw experimental data will be recorded in the laboratory computers. Those data will be entered into several documents on the computer e.g. word, PowerPoint, etc.

Ethics and Legal Compliance

How will you manage any ethical issues?

All experiments did not involve human volunteers and living animals.

How will you manage copyright and Intellectual Property Rights (IP/IPR) issues?

The intellectual Property Rights of this project will be protected by The University of Hong Kong. The copyright will be reserved by Dr. Francis Ling, the principal invigilator of our research group.

Storage and Backup

How will the data be stored and backed up during the research? i. e. until stored in the final location (e.g. on your password protected laptop)?

The data will be stored in the computer above my office desk.

How will you manage access and security?

The laboratory data will be saved in the lab computer and only our group holds the password.

Selection and Preservation

Which data are of long-term value and should be retained, shared, and/or preserved?

All data obtained will be retained and preserved and are of long-term value. Those data will be shared when they are used for academic journal publishing.

What is the long-term preservation plan for the dataset?

Data will be entered into the computer as the progress report and shared with my supervisor.

Data Sharing

How will you share the data?

The data will be shared with my supervisor initially, and the accessibility will be extended to the public once the data is published in an academic journal.

Are any restrictions on data sharing? If yes, Why?

Any data not ready to publish to the public is considered as confidential, only our research group members and/or my supervisor are able to share them.

Once the data is published to the public, no restrictions for accessing the data anymore.

Responsibilities and Resources

Who will be responsible for data management?

My supervisor, research partner and I will be the person in charge of the management of all the data

in this project including collection, storage, backup, and sharing.

What resources will you require to deliver your plan?

The facilities provided by the department of physics, include SEM, TEM, XRD, etc.

Relevant equipment is also needed from our laboratory to deliver our plan e.g. Keithelt 2612B, probe stage.etc.
