MOSCap Learning Materials

By completing the MOSCap Lab in **ABACUS - Assembly of Basic Applications for Coordinated Understanding of Semiconductors**, users will be able to:

1. Understand the operation of a Metal-Oxide-Semiconductor using energy band diagrams.
2. Study the effects of interface traps, work function, oxide thickness, etc. on capacitance-voltage output.
3. Understand MOS-C C-V characteristics in low and high frequency limits.

The specific objectives of the MOSCap Lab are:
Recommended Reading

Users who are new to the operation of MOS-Caps should consult the following resources:


Demo

* MOSCap: First-Time User Guide

* MOSCap Demonstration: MOS Capacitor Simulation

Theoretical Descriptions

* Tutorial_PADRE_Simulation_Tools.pdf (tutorial)

* Illinois ECE 440 Solid State Electronic Devices, Lecture 31: MOS Capacitor

* Illinois ECE 440 Solid State Electronic Devices, Lecture 32: MOS Threshold Voltage


* ECE 606 Lecture 32: MOS Electrostatics I

* ECE 606 Lecture 33: MOS Electrostatics II
* ECE 606 Lecture 34: MOSCAP Frequency Response

* MOS Capacitors: Theory and Modeling

Tool Verification

* Verification of the Validity of the MOSCap Tool

Examples

* MOSCAP Worked out problems (Basic)

Exercises and Homework Assignments

1. Exercise for MOS Capacitors: CV curves and interface and Oxide Charges

2. Exercise: CV curves for MOS capacitors

Solutions to Exercises

Solutions are provided only to instructors!

Evaluation

* ABACUS: Test for MOSCAP Tool

Challenge

* MOSCAP CV profiling