



Infineon Technologies Austria AG develops and manufactures power semiconductors for Automotive, Powermanagement&Multimarket, Industrial Power and Chipcard solutions. The Industrial Power Control Division of Infineon concentrates on electrical drives and renewables. This primarily encompasses components for drives in industrial applications, such as machines or locomotives, and energy generation components in solar or wind power plants. To reach highest energy efficiency, the Infineon product portfolio provides components based on wide band gap semiconductors like silicon carbide (SiC).

KAI Kompetenzzentrum für Automobil- und Industrieelektronik GmbH, an industrial center of expertise situated in Villach, focuses on several relevant fields of its industrial partner Infineon. KAI performs state-of-the-art research in all areas of semiconductor reliability.

Master Thesis

„Electrical characterization of SiC MOSFET interface properties“

Wide band gap semiconductors like silicon carbide (SiC) have a broad range of promising material properties which make SiC MOSFETs advantageous compared to devices based on silicon. However, difficulties in the oxidation of SiC as well as enhanced surface roughness of SiC lead to large numbers of point defects at SiC/SiO₂ interfaces. In a SiC MOSFET, such electrically active imperfections enhance the on-resistance of the device and cause instabilities of important transistor parameters. Thus, a major goal in the fabrication of an efficient and reliable SiC MOSFET switch is to reduce the number of defects at the SiC/SiO₂ interface. This is done by adjusting process procedures and parameters. To evaluate the number and properties of interface defects, sophisticated electrical measurement techniques are needed. Supported by the wide expertise and excellent measurement equipment at KAI, analysis of available particularly designed SiC based MOSFETs will imply manifold scientific output and support ongoing technology development at Infineon.

Objectives of the thesis

The student will be trained at KAI to understand and perform different electrical characterization techniques currently used for the evaluation of Si MOSFET interfaces (current-voltage or capacitance-voltage sweeps, charge pumping, time-resolved current/capacitance measurements, on-chip temperature switches using in-situ poly-heaters,...). He/she will then use this knowhow to test, adapt and extend similar techniques for the characterization of SiC MOSFET interfaces. The functional ability and consistency of different analysis techniques has to be demonstrated.

The student will be primarily supervised by a PhD student at KAI. Infineon will support the student with samples and will introduce the student into SiC MOSFET manufacturing/physics.

Prospective duration:	6-8 months
Location:	KAI, Europastraße 8, 9524 Villach / Infineon, Siemensstraße 2, 9500 Villach
Remuneration:	The monthly remuneration is 1.640€, based on the collective agreement for workers and employees in the electrical and electronics industry, employment group A. (http://www.feei.at/kollektivvertraege/kv_tabelle).

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