



## **Research engineer position on microelectronics:**

### **Physical failure analysis of MOSFET SiC transistors under ESD stress and Single Event Burnout**

**Context and subject:** The research engineer position is proposed by the “Groupe de Physique des Matériaux”, GPM UMR 6634 CNRS lab, from the University of Rouen Normandy-CNRS, in the Microelectronics, Materials and Failure Research Team. The project is part of the Carnot ESP project "SiC-Ageing", the subject is the "Characterization of local electrical and mechanical modifications of the SiC chip after ageing (electrothermal ageing and irradiation)". It is being carried out in collaboration with the CRISMAT laboratory at the University of Caen.

The impact of accelerated ageing, simulating the life of the component in its environment, will be determined thanks to the characterization of the local properties of the active parts, i.e. at the heart of the SiC material. Electrical characterization benches available at the GPM will enable the detection of ageing and failures by varying certain key parameters (static pulsed IV measurements, saturation current  $I_{dsat}$ , on-state resistance  $R_{dson}$ , transconductance  $G_m$ , gate leakage current  $I_{gss}$ , drain leakage current  $I_{dss}$ , capacitance measurements  $C_V$ .... ).

SiC-ageing proposes to analyze the degradation and deterioration of the semiconductor by electrical techniques based on an Atomic Force Microscope (AFM), the experimental part concerning the AFM will be carried out in collaboration with a post-doc from the CRISMAT laboratory in Caen.

For this purpose, fine preparations of the components in the package (front or back face) are essential and will be developed within the framework of this work. It will thus be possible and necessary to locate the defects within the component by de-packaging, laser ablation or chemical etching, then by PEM photoemission microscope or by OBIRCH (Optical Beam Induced Resistance Change) techniques.

**Workplace :** Rouen - Saint Etienne du Rouvray - Normandy - France - Groupe de physique des matériaux UMR CNRS 6634. Access to the GPM is regulated (ZRR: restricted areas) and recruitment is subject to the favourable opinion of a request for access.

**Main scientific field :** Physics

**Secondary scientific fields:** Electronics, Materials

**Keywords:** SiC MOSFET, ESD stress, electrical characterization, fault location, physical failure analysis.

**Duration:** 4 to 6 months, start of postdoc desired on 1 October 2024

**Application deadline :** 31/07/2024

**Employer:** University of Rouen Normandy

**Gross monthly salary:** 2.3 keuros, Depending on professional experience

**To apply:** send by email with CV and cover letter

**Different missions :**

- To analyse and master the experimental means of electrical characterisation available at the GPM, implementation on sample components. Develop and apply sample preparation methods (de-pakaging, laser ablation, chemical etching, front and rear opening, etc.) on the study components. Implement measurements by PEM and OBIRCH photon emission microscopy to locate defects.

**Candidate profile:** Candidate with a strong academic track record in microelectronics or/and materials, experimental skills will be highly appreciated.

Interested candidates should send a CV, a cover letter to Pr. Pascal Dherbécourt: [pascal.dherbecourt@univ-rouen.fr](mailto:pascal.dherbecourt@univ-rouen.fr).