



## **Post-doc Fellowship at GREMAN (Tours University)**

**Starting date : As soon as possible**

**Topic: *Dopant electrical activity in wide band-gap semiconductor (GaN)***

Wide band-gap semiconductors (SiC, GaN) are the subject of intensive research and development activities. This growing attention is motivated by attractive mechanical and electrical properties which make silicon carbide and gallium nitride promising materials for high power and high temperature electronic devices. GaN can be heteroepitaxially grown on silicon substrates even though the lattice mismatch is still high. The capability to grow the material on low cost and large diameter silicon substrates becomes then an extremely attractive solution for manufacturing. In this framework, power Schottky barrier diodes (SBD) have nowadays broad developments.

Since many years, GREMAN has developed known-how in implantation and subsequent dopant activation for industrial applications. In this work, we propose to develop reliable junctions by implantation in wide band-gap material. Indeed, schottky barrier diodes (SBD) generally employ junction termination to ensure the maximum blocking voltage. Heavily doped guard ring are requested. Moreover, ohmic contact for the cathode zone may be also requested if a vertical design is not accessible. Implantation and subsequent annealing need also to be studied before its implementation in this case. A complete study of the doped zone realization is actually on going at GREMAN.

To insure the realization of efficient junctions or doped zones, electrical characterizations is essential. In wide band gap material, the common electrical dopant profiling techniques are not suitable due to its extreme physical properties. However, the availability of 2D reliable dopant profiling is a key tool to understand junction formation and try to avoid failure in devices. The Scanning Capacitance Measurement (SCM) as well as Scanning spreading resistance microscopy (SSRM) are the leading technique to measure such profiles in wide band-gap materials (here essentially GaN). These characterizations are hence a key issue for the development of devices in such materials and will be the aims of the work developed here.

### Background:

The candidate must have a PhD in material science or electronics, ready for team work. A large background in AFM techniques is essential for this position (especially on the Veeco system). Ideally, the candidate has knowledge in electrical mode (SCM, SSRM, C-AFM or TUNA). Moreover, knowledge in wide band-gap material will be a plus.

This work will be done in close cooperation with STMicroelectronics Tours

To apply for this position please send CV and a cover letter including date available to start, a full list of publications as well as the names of three references to:

Pr. Daniel ALQUIER  
GREMAN (STMicroelectronics site)  
16 rue Pierre et Marie CURIE  
BP 7155  
FRANCE 37071 TOURS CEDEX 2  
Tel : (+33) 2 47 42 40 40  
E-mail : [daniel.alquier@univ-tours.fr](mailto:daniel.alquier@univ-tours.fr)