Ph.D. Student position at INL in the Lyon Metropole (Ecully/Villeurbanne)

Optimising ferroelectric (FE) memory properties by interface engineering

Job description

In the context of development of non-volatile memories ferroelectric (FE) material-based memories represent a challenging path considered to replace the existing Flash memories. They indeed present a very low consumption which is a pervasive need for on-board devices. However up to date a large implementation of such materials has been hindered by obstacles among which the wake-up and fatigue phenomena which are related to the presence of defects. These defects, related to the electrode/FE material interfaces, affect device performances both the in early and late stages of use which has detrimental effects on the component performances and life cycle.

To overcome these obstacles the proposed PhD candidate will address 3 main tasks: (1) Ferroelectric film engineering: HZO films will be deposited at INL by PVD and ALD according to various processing conditions. Interface layer engineering will be implemented. (2) Thorough physical and electrical characterization of the thin film stacking will be performed to ensure feedback with the fabrication conditions and to converge to optimized conditions. (3) Optimized demonstrators will be realized (MIM and FeFET) and characterized

Research profile & skills

- Master degree (or equivalent) in physics or material science or nanocale engineering preferentially with a thesis related to thin films
- Experience in thin film deposition techniques (PVD, CVD, ALD..)
- Experience in processing, developing and characterizing thin films
- Have a solid understating of physics and of semiconductor devices
- Fast learner, hands-on and flexible attitude
- High degree of responsibility while collaborating with team and lab mates and other lab staff
- Good management skills, good presentation skills, excellent written and oral English level (among non-native English speakers, equivalent TOEFL score of 100 or higher)

Scientific environment: The candidate will work mainly at INL, Institute of Nanotechnology of Lyon, in the “Electronic Devices” and “Functional Materials and Nanostructures” groups. Located in the heart of a great scientific environment and major French city, INL provides the applicant an exciting place to work. The lab is indeed very dynamic and international. The candidate will be integrated in the international and national scientific communities of ferroelectric thin films and will participate to related conferences (Int. Symposium on the Application of Ferroelectrics, Workshop on Oxide Electronics..)

INL website: [https://inl.cnrs.fr/](https://inl.cnrs.fr/)

Salary: the position is for a 3-year duration, supported by the French MESR (ca. 1700 euros gross)

Application procedure: Please send motivation letter, CV and the name of 2 contact references to Bertrand Vilquin (Bertrand.Vilquin@ec-lyon.fr) and Martine Le Berre (Martine.Leberre@insa-lyon.fr)

Closing date for applications: 28 April 2022