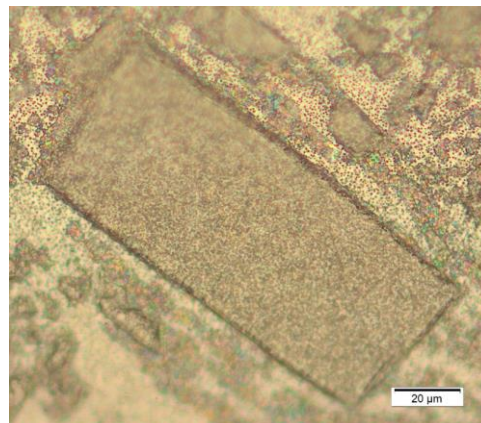


## *R&D Internship*

### **"Process for producing active layers based on ferroelectric/piezoelectric salts on porous silicon"**

#### **Context**

Ferroelectric/piezoelectric crystals of Rochelle salt (RS) have already been integrated into nano or micropores in alumina substrates, dramatically changing their dielectric properties [1]. Measurements carried out in the temperature range encompassing the points of the two structural phase transitions in RS revealed a considerable broadening of the region of existence of the ferroelectric phase [2]. A preliminary study of the growth of this salt on silicon micropores (fig.1) showed interesting electrical properties. The integration and characterization of piezoelectric salt layers of RS or ADP (monoammonium phosphate) on Si-porous therefore deserves to be explored as it seems promising.



*Figure 1 - Optical microscope image of an RS single crystal on porous silicon.*

#### **Internship assignments**

The proposed internship will take place on the GREMAN site, and more specifically, within the [CERTeM](#)<sup>1</sup> technology platform, comprising almost 400 m<sup>2</sup> of cleanroom space.

The aim of the internship will be to participate in the characterization of porous silicon samples with different pore sizes. This will be followed by liquid-phase growth of a crystalline layer of RS or ADP on the surface of a prepared substrate. This will be followed by electrode deposition and sample characterization. Both structural and electrical properties will be tested on fabricated components. The work carried out may be the subject of scientific publications.

#### **Candidate profile:**

The candidate will be an engineer or Master 2 with a solid knowledge of materials, possibly applied to microelectronics. Cleanroom skills would be a plus, but experimental skills are what we're looking for. It will be essential for the person recruited to have the human qualities required to fit into multidisciplinary work teams.

#### **References :**

- [1] Golitsyna, O. M., Drozhdin, S. N., Gridnev, A. E., Chernyshev, V. V., & Zanin, I. E. (2010). Dielectric properties of porous aluminum oxide with inclusions of triglycine sulphate and Rochelle salt. *Bulletin of the Russian Academy of Sciences: Physics*, 74, 1291-1294.
- [2] Baryshnikov, S. V., Charnaya, E. V., Stukova, E. V., Milinskiĭ, A. Y., & Tien, C. (2010). Dielectric studies of nanoporous alumina films filled with the Rochelle salt. *Physics of the Solid State*, 52, 1444-1447.

#### **How to apply:**

Applications (CV and covering letter) should be sent by email to :

#### **GREMAN Laboratory :**

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<sup>1</sup> CERTeM: center for technological studies and research in microelectronics - <https://certem.univ-tours.fr/version-francaise/plateformes/plateforme-certem-rd>