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Talk Title *

Multi-Modal FIB-ToF Methodologies to Address Nanoscale Characterization Challenge in Microelectronics

Authors (underline the presenting/speaking author) *

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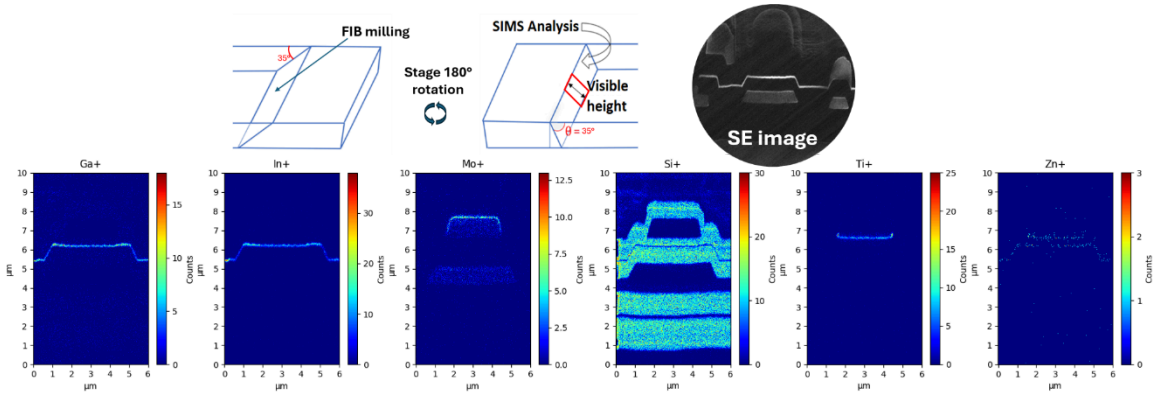
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ABSTRACT

The rapid development of advanced materials, particularly in microelectronics, increasingly demands ultra-high-resolution analytical tools capable of probing chemical, structural, and compositional properties at the nanoscale. Traditional characterization techniques often fall short in providing comprehensive, multi-scale insights required to understand and optimize these complex systems. To address this need, we leverage the NanoSpace platform (Orsay Physics), a versatile UHV modular system that integrates a wide range of analytical techniques, including Focused Ion Beam (FIB), Scanning Electron Microscopy (SEM), Gas Injection System (GIS), Orthogonal Time-of-Flight Secondary Ion Mass Spectrometry (O-TOF-SIMS), and also EDX and EBSD. Its modularity and extensive configuration options, including a broad selection of ion sources, enable tailored solutions for diverse applications, from dopant mapping to interface analysis and 3D chemical imaging [1,2].

In this work, we demonstrate how multiple ion source technologies and advanced methodologies within the NanoSpace platform were employed to tackle a challenging microelectronics application. By combining FIB, SEM, and O-TOF-SIMS, we achieved high-precision chemical and structural analysis, addressing critical questions such as pollutant distribution, and heterogeneity in 3D device at nanoscale.



[1] J. Almoric, M. Durand, Physica Status Solidi A 219(9), 2022.

[2] T. Meyer, T. Gutel, ACS Applied Energy Materials 7(21), 2024, 9939-9952.

Keywords *

FIB–SEM–O-TOF-SIMS correlative analysis, Nanoscale chemical imaging, 3D microelectronics characterization, Dopant and contamination mapping