Frontiers of Ga+ FIB-SEM Applications

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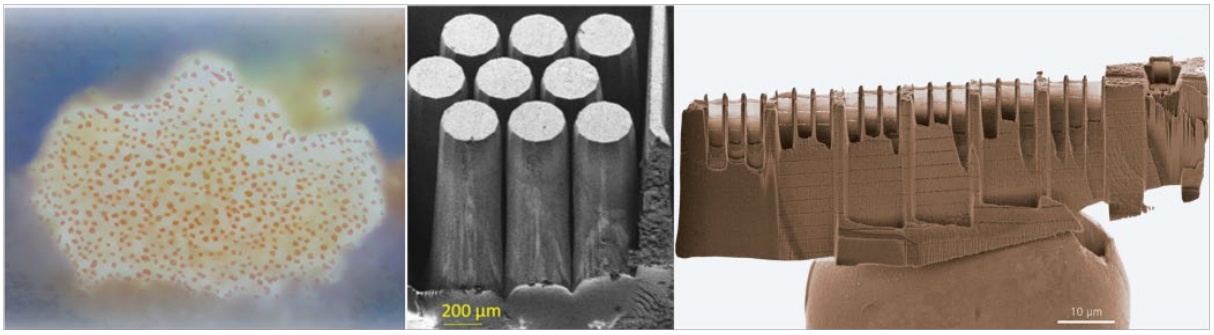
When Ga+ FIB-SEM instruments first emerged in the 1990's, they caused a sensation among analysts in the semiconductor industry, who saw these instruments as nearly "magic machines" despite the limitations of those early columns. Over the years, improvements in hardware and software have produced systems with excellent beam stability and brightness, along with the integration and automation to deliver high resolution 3D data with isotropic reconstructed voxels of <5nm possible, and volumes that overlap with PFIB [1-3] . The addition of an integrated fs-laser to the Ga+ FIB-SEM is revolutionizing the way people produce data [4], opening new vistas that were not available before. Today's instruments are used in nearly all fields and have so many different capabilities addressing so many applications, it can be difficult even for a FIB expert to stay up to date with the latest developments.

To give an idea of what is possible with a modern FIB-SEM, a selection of recent cutting-edge work representing today's Ga+ FIB capability will be presented. Noteworthy examples include FIB tomography applied to materials characterization and semiconductor analysis, as well as LaserFIB applications covering a) efficient TEM sample preparation of planar lamella, b) cross sections of difficult samples with fragile material, and c) a microsampling method that efficiently creates high-aspect-ratio pillars suited for a variety of analytical techniques [5].



Segmented FIB tomography data of nanoparticles averaging 4-10nm in diameter [1], LaserFIB pillars [5], and multi plan-view lamella, leveraging high-resolution Ga+ FIB processing and laser-enabled novel sample preparation approaches.

References

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