

Focused ion and focused electron beam induced depositions: an overview

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Over the past decades, focused ion beam (FIB) appeared to be an interesting tool for a wide range of applications as photomask and circuit repairing, sectioning for systematic process control, or even lithography [1]. Being able to perform both imaging, deposition and milling with one single tool, with a resolution easily comparable to the best ones which could be reached with optical lithography in industry makes it an ideal candidate to be incorporated in various steps of nanofabrication.

In this talk, we will be giving an overview of what could be achieved with this technique, particularly in the area of FIB assisted deposition, where the ion beam is used to locally decompose a precursor gas adsorbed on the substrate. Then, we will be focusing on the main points of caution to take into account when integrating it to a fabrication procedure. Then will move to the recent work performed in the aim of contacting superconductor crystals of different types.

We will emphasize the diverse parameters to control to get an accurate trade-off between the risk of damage by sputtering effect and a FIB induced deposition (FIBID), insisting on the challenges (side effects) we could face during this operation (precursor diffusion, partial decomposition, substrate affinity [2]).

Finally, we will show the structural and electrical characterizations performed on our microstructures and will make a direct comparison between the two techniques of deposition available on our tool, which are electron beam and focused ion beam depositions (EBID and FIBID). This, in the goal of providing the most detailed picture of the tool opportunities.

[1] S. Reyntjens and R. Puers, *J. Micromech. Microeng.* 11 (2001) 287–300.

[2] I. Utke, P. Hoffman and J. Melngailis, *J. Vac. Sci. B*, 26 (2008).