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Tutorial: FIB preparation of lamellae on chips for in-situ TEM and other techniques

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This tutorial targets a wide range of FIB operators, from beginners to long time expert users across fields, interested in preparation of lamellae on chips (LoC). Starting with a recap of the in-situ lift-out technique for preparing a TEM lamella mounted to a half-grid (Omnigrid), the terminology used throughout the tutorial is defined. Important concepts for achieving high quality TEM lamellae for different purposes are summarized.

There is an increasing demand for thin samples mounted to a specific chip, typically MEMS. Thus the core part of this tutorial discusses several protocols for preparation of lamellae on chips. Examples will cover the preparation of samples for in-situ TEM observations, synchrotron-based x-ray techniques under local magnetic field as well as for heating experiments, and a lamella precisely mounted on an optical waveguide. Furthermore, different routes for dealing with unconventional geometries are discussed.
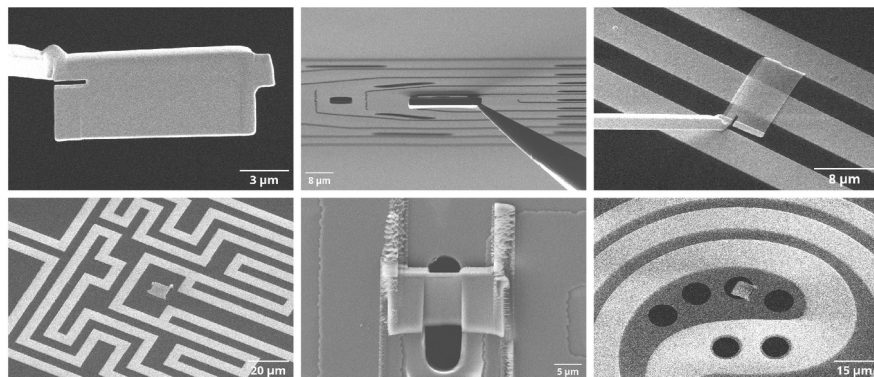

Fig. 1: Snapshots taken while preparing various lamellae on chip.