FIB Target preparation for 20 kV (S)TEM

A new method for obtaining ultra-thin lamellas

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Motivation
Sub-Ångström Low Voltage Electron Microscopy
New (old) challenges...

20 kV TEM

< 30 kV STEM
Instrument
Nvision 40 Ar

- Ar Gun (.1-1kV, 100 µm)
- GIS (Pt, C, H₂O, XeF₂, SiOₓ)
- 2 MM3A, LCMK, RoTip
- EDX (EDAX, TEAM)
- Cold Stage (Leica)
- STEM (SS + Conversion)
FIB Lamella Preparation
Specimen Requirements

TEM

HRTEM

SALVE
Limits to scalability

Conventional Preparation
Amorphization
Warping
Shrinking


0.15 eV, MC on

10 nm

$X^2$-FIB

A simple solution.
Concept
Reducing amorphization depth
Preventing lamella warping
Eliminating shrinking
Eliminating shrinking
Implementation

Another simple solution.
Using rotation to operate 2nd tilt axis.
Demo
X2-FIB Lamella