

Preparing Lamellae of the Most Fragile Interfaces with a TripleBeam FIB

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The correct interpretation of structured nanomaterials by TEM & STEM requires FIB-prepared lamella to have minimal induced damage, to be ultra-thin, and to be of uniform thickness over comparatively wide areas. Lamella of complex nanomaterials frequently suffer from Ga⁺ induced damage, bending, delamination, thermal damage, redeposition artefacts, and in severe cases, complete destruction of critical structures. This is especially true of fragile and weakly bonded organic-inorganic interfaces.

A solution to many of these challenges is the integration of a low energy glancing angle Ar⁺/Xe⁺ ion beam together with the Ga⁺ FIB-SEM. Using this TripleBeam™ technique the Ar⁺/Xe⁺ beam can be seamlessly integrated in the lamella preparation workflow. This provides a lower damage alternative to low kV Ga⁺ without the difficulty of placement of the comparatively large beam on a thin lamella. It also enables effective thinning even on bent lamella whilst offering greater thickness uniformity over wider areas. Challenging materials can be prepared as uniform, ultra-thin lamella quickly and repeatedly using this technique.