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APPLICATION BRIEF

SMI no.04
2006.4

Nanomesh - A New Mesh for HRTEM Observation

Crescent-shaped copper mesh has been traditionally recommended for TEM samples that receive additional processing. However, when this mesh is used, FIB processing produces a minute amount of sputtered material that sticks to unprocessed surfaces. This is known as redeposition. Figure 1 is a schematic of conventional mesh. Figure 2 is an SEM image of a sample being finish processed by the argon ion beam of SIINT's triple beam unit. While the amount is minute, redeposition can be seen.

Redeposition occurs on the measurement sample because the beam irradiates the mesh area outside the sample. If a large amount of material is sputtered from the mesh section, the weight of redeposited material on the sample cannot be ignored. Redeposition has become an issue in recent years as high-resolution transmission electron microscopy (HRTEM) observation increases the need for high quality, low-damage FIB sample preparation.

SIINT has solved this issue by developing a new mesh for TEM measurement samples. This mesh is called nanomesh and has the following structure.

The nanomesh is composed of a sample mounter made of silicon and mesh made of molybdenum. The sample mounter has five locations to mount samples. The mounter was manufactured using microelectromechanical systems (MEMS) processing. Tip thickness is about 5 μm so redeposition on the sample does not become a problem.

If the nanomesh is used, high-quality TEM samples can be prepared without any worry of redeposition. Figure 4 is a SEM image of a sample using nanomesh. The image shows that redeposition has been dramatically decreased. Nanomesh is particularly advantageous when using the argon beam of the triple beam unit for finish processing.

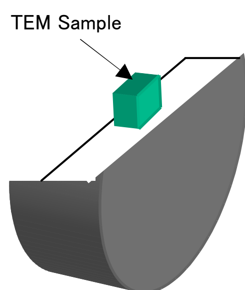

Figure 1. Conventional Mesh

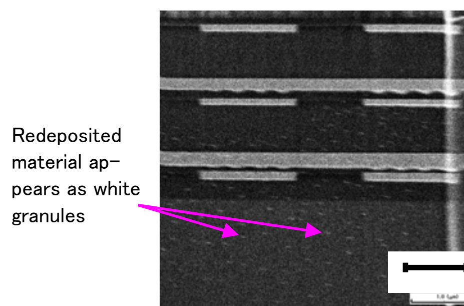

Figure 2. Cross-Sectional SEM Image of the Opposite Side of a Surface Finish Processed By an Argon Ion Beam

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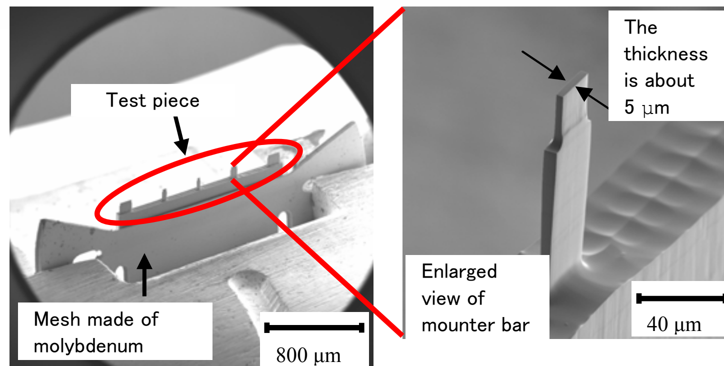

Figure 3. SEM Image of Nanomesh

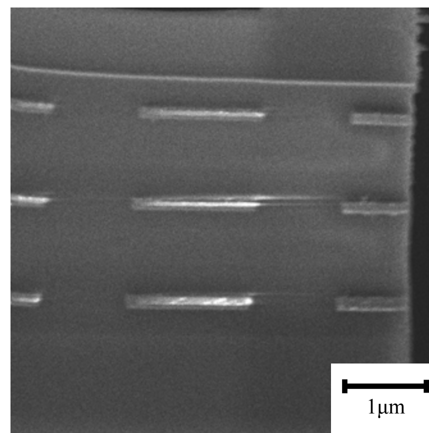

Figure 4. Cross-Sectional SEM Image of the Opposite Side of a Surface Finish Processed By an Argon Ion Beam (Nanomesh Used)

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