Claims

1. A method of preparing a sample for transmission electron microscope (TEM) analysis, the method comprising:

thinning a specimen to a bulk thickness that is non-transparent to electrons, the thinning being performed on a first surface of the specimen exclusively by laser milling using a laser;

ablating a region in the first surface of the specimen such that the region is thinner than the bulk thickness, the ablating being performed exclusively by the laser within the region to leave other parts of the first surface unmodified by the ablating;

providing a sensor to sense only a transmitted part of the laser; and

ending the ablating in response to sensing that at least one penetrated part of the region is transparent to electrons, such that a sampling point for the TEM analysis is selectable from an ablated area at or neighboring the at least one penetrated part,

wherein the ablating is ended upon the sensor first sensing the transmitted part of the laser.

2. The method according to claim 1, further comprising: providing the laser at an angular displacement relative to a normal axis after the thinning and before the ablating such that the laser is directed at the specimen at an inclination angle during the ablating, wherein the laser is directed at the specimen along the normal axis during the thinning.

3. The method according to claim 2, further comprising:

selecting a selected plurality of the region in the first surface; and

repeating the ablating and the ending thereof for each of the selected plurality of the region.

4. The method according to claim 3, further comprising: reconfiguring the inclination angle for the ablating of different ones of the selected plurality of the region, such that the different ones of the selected plurality of the region are each characterised by differently inclined surfaces.

5. The method according to claim 1 or claim 2, wherein the ablating forms a recess in the region in the first surface.

6. The method according to claim 5, wherein the recess is at least partially defined by an inclined surface with a linear profile corresponding to a path of the laser performing the ablating.

7. The method according to claim 5 or claim 6, wherein the recess is characterized by a non-uniform thickness ranging from the bulk thickness to a sampling thickness, the sampling thickness being a thickness at which the specimen is transparent to the electrons.

8. The method according to claim 7, wherein the sampling thickness is in a range from 30 nm to 50 nm, inclusive.

9. The method according to any one of claims 5 to 8, wherein the recess comprises one or more wedge-shaped material providing at least one ablated area at a thin end of the one or more wedge-shaped material.

10. The method according to any one of claims 1 to 9, wherein the at least one penetrated part comprises a through hole.

11. The method according to claim 10, wherein the ablated area neighboring the through hole is characterised by the sampling thickness.

12. The method according to any one of claims 1 to 11, comprising:

before the ablating, cutting the specimen from a bulk material such that the specimen is accommodatable in a TEM sample holder of the TEM.

13. The method according to any one of the claims 1 to 12, wherein the bulk thickness is in a range from 10 μm to 30 μm, inclusive.

14. The method according to any one of claims 1 to 13, wherein for the ablating, the laser is configured to follow a helical scanning path in the ablating.

15. The method according to any one of claims 1 to 14, wherein for the ablating, the laser is configured as an ultrashort pulse laser.

16. The method according to claim 15, wherein the laser is configured with a single pulse energy that decreases over the ablating of the region.

17. A method of preparing a foil of a material, the method comprising:

thinning a specimen to a bulk thickness, the thinning being performed on a first surface of the specimen exclusively by laser milling using a laser;

ablating a first region in the first surface of the specimen such that the first region is thinner than the bulk thickness, the ablating being performed exclusively by the laser;

providing a sensor to sense only a transmitted part of the laser;

ending the ablating in response to sensing that at least one penetrated part of the first region is at or thinner than a target thickness at which the material is transparent to electrons, wherein the ablating is ended upon the sensor first sensing the transmitted part of the laser; and

repeating the ablating and the ending thereof at another region contiguous with the first region until a predetermined contiguous area of the first surface is transparent to electrons.

18. A foil formed according to the method of claim 17, wherein the foil comprises a predetermined contiguous area having a foil thickness that is transparent to electrons.

19. The foil according to claim 18, wherein the foil thickness is 50 nm or thinner than 50 nm.