

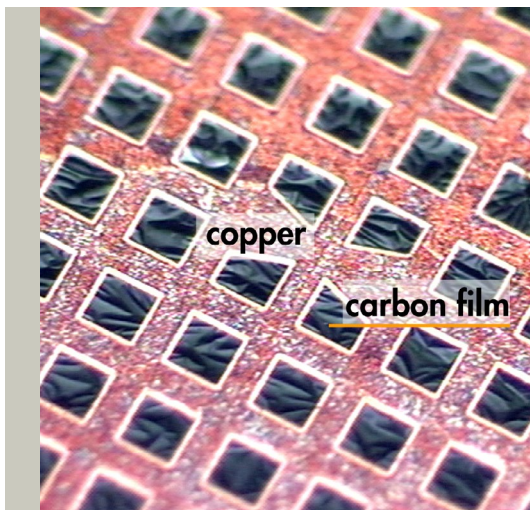
Effect of plasma cleaning on carbon support films for field emission gun transmission electron microscopy

Analysis of specimens in a high-performance field emission gun transmission electron microscopy (FEG TEM) requires removal of carbonaceous contamination in an instrument such as the Model 1020 Plasma Cleaner or the Model 1070 NanoClean.

To plasma clean cross section (XTEM) specimens prepared with a focused ion beam (FIB), it may be necessary to first place them on a support film such as carbon. This film is, in turn, supported by a standard metal grid often formed from copper, nickel, or molybdenum.

An oxygen-rich plasma will remove carbon from the film as the specimen is cleaned. If the film is degraded excessively, the specimen may be lost.

The standard operating parameters of both Fischione plasma cleaners can be modified to accommodate carbon support films. After substituting 2% for the standard 25% oxygen (balance is argon), the gas pressure, gas flow, and RF power settings were optimized. The result was that the time for effective cleaning without film degradation was increased from 20 seconds in 25% O₂ to 2 minutes in 2% O₂.



PLASMA CLEANING CARBON SUPPORT FILMS

A standard (~50 nm thick) carbon film supported by a 400-mesh copper grid is depicted after 2 minutes of plasma cleaning. TEM examination revealed no significant thinning of the film until it was plasma cleaned for times approaching 3 minutes.