BactiZapper Application Note

SPI Supplies
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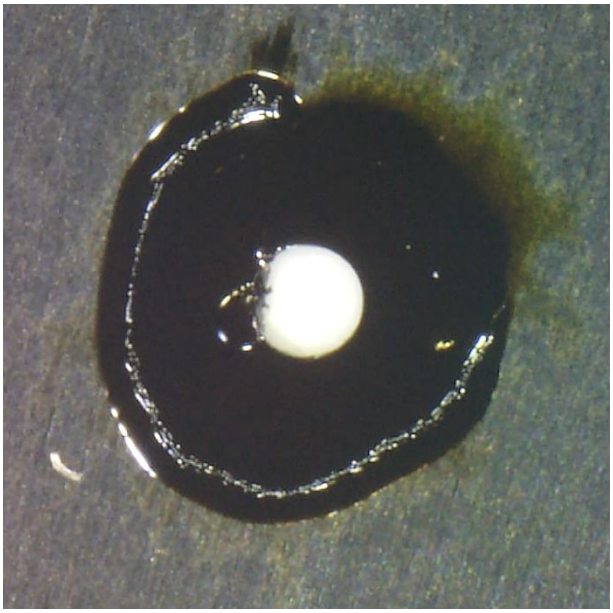
Aperture cleaning using the BactiZapper Infrared Micro Sterilizer

Apertures are fundamental elements for the image formation functions in electron microscopes. An aperture consists of a circular hole in a metal disk or strip, typically Pt or Mo, and its function is to control the amount of electrons passing through the lenses.

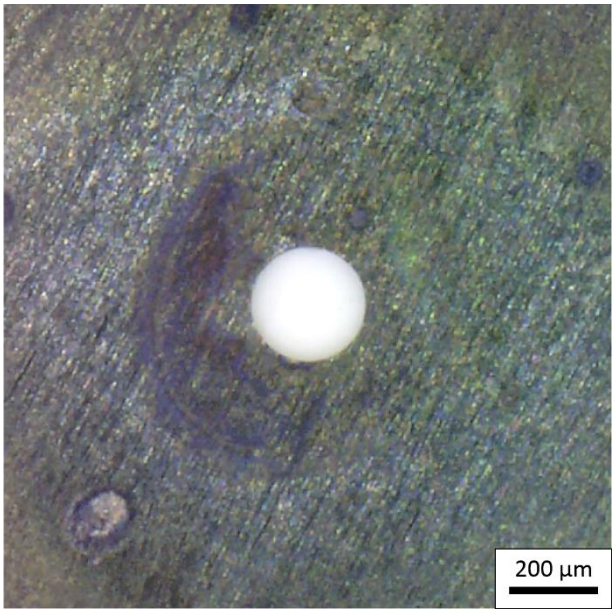
During the operation of an electron microscope, due to the action of the electron beam, residual carbonaceous contaminants present in the vacuum may deposit and accumulate on the edges of the apertures destroying their circular shape and resulting in poor performance of the electron microscope. Contaminated apertures can be cleaned using heat to boil the contamination off, and it is usually done by flaming the aperture to bright red for a few seconds using a Bunsen burner.

The BactiZapper Infrared MicroSterilizer can be used as a flameless alternative for cleaning apertures using heat in open air. It reduces the risks associated with working with a flammable gas and an open flame. It offers two temperature settings: low (500 °C) and high (825 °C). The figure below shows a contaminated aperture before and after cleaning using the BactiZapper Infrared Sterilizer.

before cleaning



after cleaning



Cleaning procedure:

- Wear safety glasses and gloves.
- Turn the BactiZapper switch to the desired temperature setting and wait twenty minutes for heat to build up.
- Place the aperture disc or strip in an insulated platinum holder. For large aperture disks or stripes, a round-bottom borosilicate glass tube with an insulated grip can be used as holder.
- Gently insert the holder into the BactiZapper and hold for a few seconds. Do not heat the apertures during long periods of time since metals will corrode at high temperature.
- Inspect the aperture disc or stripe using a magnifying glass or optical microscope. Verify that all the contaminants accumulated at the edges of the aperture were eliminated.
- Repeat procedure if required.

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