

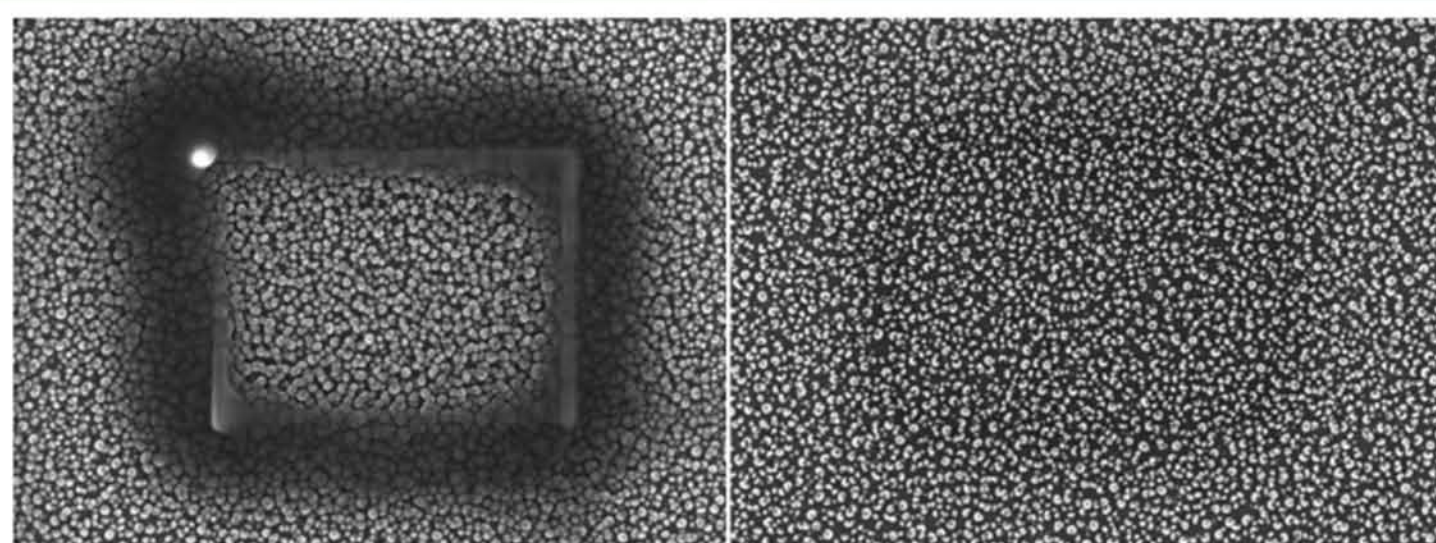
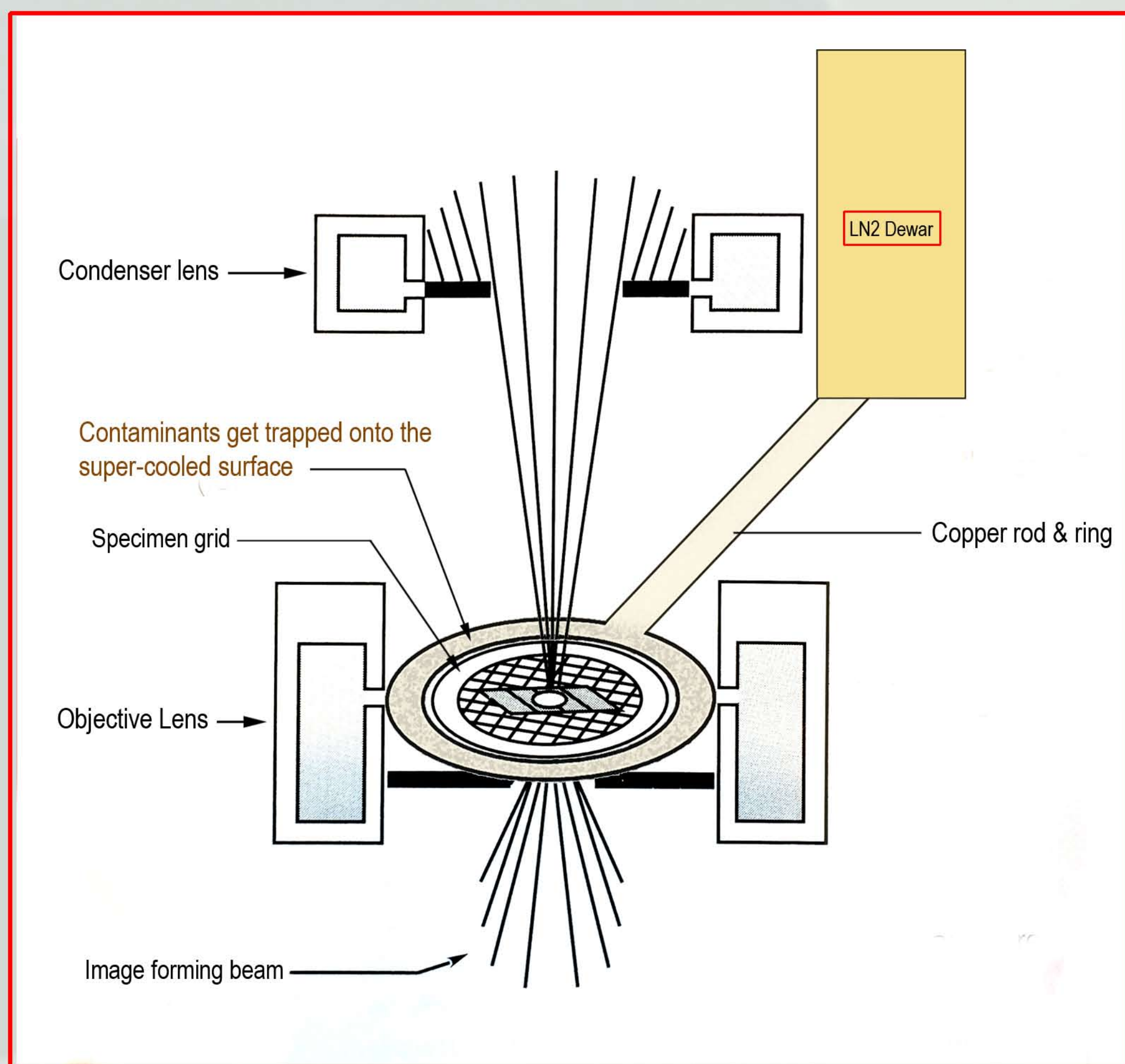
Mystery of the Anti-Contamination Device (ACD) in the Transmission Electron Microscope (TEM) explained

Modern TEMs often come with a special attachment called the ACD. Sometimes, it is also known as the “cold fingers” or “cold trap”. Since it operates with Liquid N₂, users often confuse that it is somehow related to the Cryo-EM technique. Another myth involves the belief that this device can help reduce the contamination of the microscope column thereby allowing the instrument to operate more efficiently. In actual, the ACD has its unique function which is essential to high resolution EM imaging. This presentation helps to clarify what the ACD is and how it works.

FACTS

- The micro-environment of the specimen area has the highest concentration of contaminants*.
- Contaminants get polymerized under the beam can deposit onto the surface of the specimen, obstructing fine structure details.
- The ACD provides a super-cooled surface around the specimen to trap contaminants and prevent them from depositing onto the specimen.

*contaminants= residual organic molecules (from air / finger grease / specimen / diffusion pump back streaming)



Two locations of a silicon “grass” sample irradiated for 10 min before (left) and after (right) the use of Evactron anti-contamination device. 50 000x

Baking: The liquid nitrogen in the ACD has to be “burnt off” after an imaging session, to prevent condensation around the specimen area in the event if air is introduced into the column.

Useful resource

https://www.researchgate.net/post/How_does_the_anti-contamination_device_of_transmission_electron_microscope_work