ice cold stability.

ANALYTICS

CORE COMPETENCIES

1. Virtually vibration free
2. 6 DOF
3. No mechanical moving parts
4. Only the sample area is cryogenically cooled
5. No liquid nitrogen

What are the mechanisms behind cell functioning and disease? In life sciences research, studying cryogenic samples of proteins, viruses and bacteria becomes more and more popular to answer these questions. This leads to an increased demand for cryo-electron microscopy. We have a cryogenic micro cooler for integration in the electronic microscope on the market. It offers unrivaled vibration-free operation.

Six degrees of freedom

16 centimeters – that is all. It suffices to keep cryogenic samples at temperatures between minus 150 to almost minus 200 degrees Celsius. This size allows for easy integration in an electron microscope set-up. Various types of sample holders can be connected to a tube the size of your little finger, which houses the cooler: a microfluidic chip made with lithography techniques. A small box fixed to the tube contains

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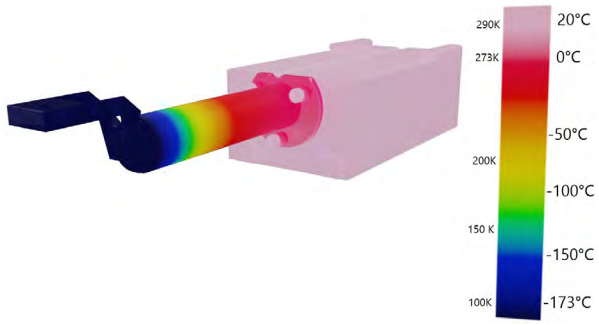
some tubing and enables mounting: no mechanical parts are involved. This means hardly any vibrations – vital for electron microscopy. Our cryocooler can be combined with a stage offering six degrees of freedom, enabling sample study from any angle.

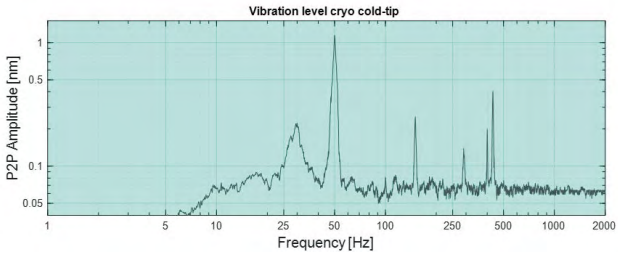
The 'secret' of the cooler chip is that it allows for an expansion cycle of nitrogen gas through the chips' channels. A very important benefit is the temperature gradient over a tiny distance – from room temperature to almost minus 200 over mere centimeters. Only the sample area is cold, all surrounding hardware stays at environmental temperature.
Our cryocooler is operated with lab-standard nitrogen bottles. The tiny flow makes the system frugal with gas. During non-stop operation, a bottle will last for a whole week.

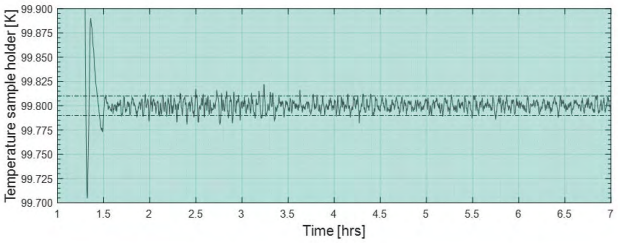
Rock solid stability

Currently, our cryocooler typically creates 1 nanometer peak-to-peak vibrations. Demcon now aims at an even better performance: engineers work at reaching 0.1 nm p2p or lower. Almost equally important is thermal drift. Temperature control is the key to stability here.

Our cryocooler has an accuracy better than 10 milliKelvin stabilized temperature control between 100 to 300 degrees Kelvin, retaining drift below 3 nanometers per minute. The cold-stage has already been integrated into the FIB/SEM setups. The field of application is now extended to X-Ray Microscopy (XRM), Transmission Electron Microscopy (TEM), and Laser Scanning Microscopy (LSM).







This cold-stage is a typical example of our engineers ingenuity and our slogan: "imagine tomorrow. challenge today."

"only cool where it counts."