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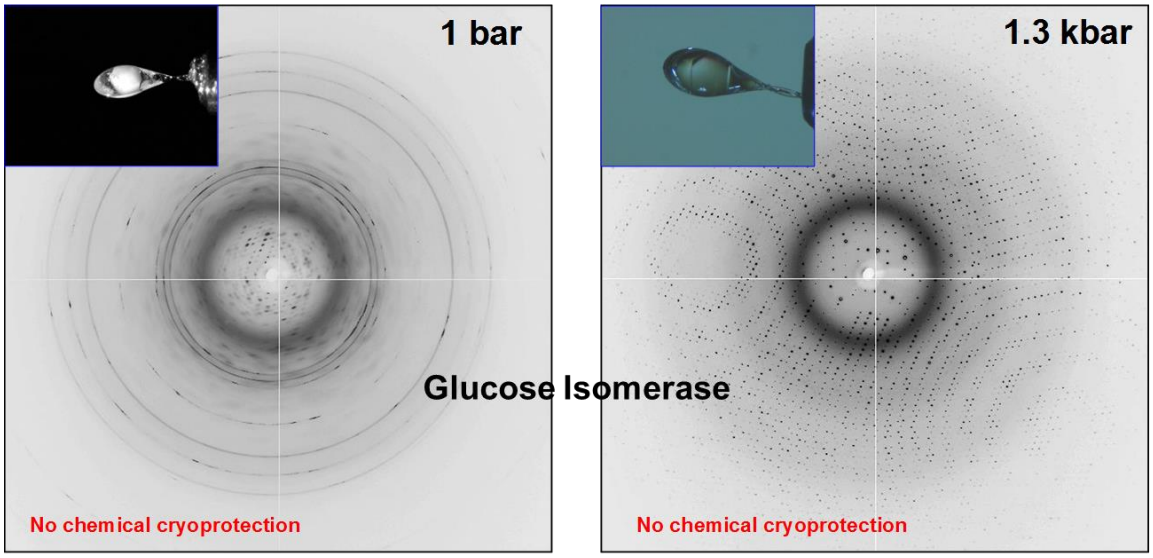
High Pressure Cryo-Cooler for X-Ray Crystallography (HPC-201)

ADC is offering a High Pressure Cryo-Cooler for preparing protein crystals. This device is based on a process developed by Cornell University scientists Prof. Sol M. Gruner and Dr. Chae Un Kim. This exciting new technology enables the simultaneous capture of both amplitude and phase information from single anomalous diffraction (SAD) of a cryocooled protein crystal, thereby providing sufficient data to solve the crystal structure of a protein with an unknown structure. Flash-freezing at atmospheric pressure requires the use of cryoprotectants. Finding the right cyroprotectant for a sample type can be a long trial-and-error process. The High Pressure Cryo-Cooler eliminates the need to use cryoprotectants and produces superior results.

The scatter images below of a glucose isomerase crystal prepared at atmospheric pressure (left) and under high pressure (right) demonstrate the benefits of high-pressure cryocooling.



Resolution = 5.0 Å
Mosaicity = N/A

Resol. = 1.1 Å (1.3 Å for 3 crystals)
Mos. = 0.39˚ (0.48˚ for 3 crystals)

The high-pressure cryo-cooler is designed to hold 3 samples at a time. Crystal samples are picked up using a standard cryoloop. Cryoloops are mounted to heavy duty stainless steel tubing in the unit and are then ready to be pressurized and cooled. A high pressure oil pump provides helium gas to the samples. External controls allow the sample to be first pressurized and then cooled by a LN_2 bath. Once pressure is released the samples can be removed and handled like any other samples prepared by the conventional flash freezing.

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Features

Pressurizing Gas	Helium
Working Pressure	200 MPa
Cooling Fluid	LN_2
Cryo Cooling Temp	77 K (-196 °C)
Sample Capacity (per pressure & cooling cycle)	3
Process Time	< 10 min (2 min for pump operation; ~ 5 min under pressure; 1min freezing)
ZEISS Microscope	SteREO Discovery.V8
LN2 dewar	Taylor-Wharton HC34

Connection Data

Voltages, frequencies	50/60 Hz
Power input, approx.	115/230 VAC
Oil pump pressure	200 MPa
LN_2 Dewar Holding	200 Days