

REPORT: SC3028

We conducted cryogenic x-ray diffraction microscopy data measurement on high-pressure frozen D. radiodurans and extracted mitochondria. Samples were prepared at Cornell University, USA using high pressure freezing setup designed for macromolecular crystallography experiment. Sample evaluation by speckle measurement and optical microscopy during the beamtime revealed that many samples were contaminated by crystalline ice formation during air-transfer, even though the powder diffraction measurement on the same samples at CHESS, Cornell before the shipping showed high-density amorphous ice of the sample condition.

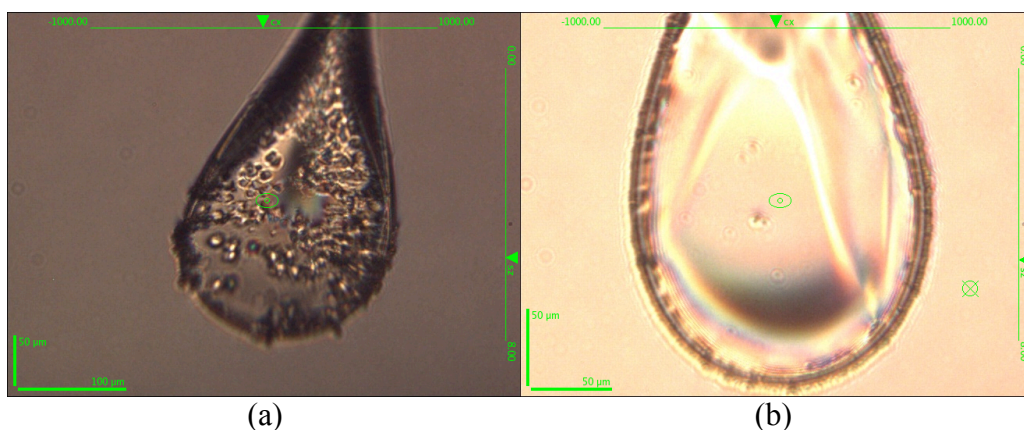


Figure 1. Examples of the loop conditions before data collection. Most loops were highly contaminated by crystalline ice formation during shipping as shown in (a). Some loops showed better condition shown at (b). However, overall speckle visibility was lower than the ones from the samples that were plunge-frozen into liquid ethane onsite.

To ensure better sample condition, we made new samples onsite by plunge-freezing cultered D. radiodurans into liquid ethane. We collected 2D and a preliminary full 3D data set from a D. radiodurans as shown in figure 2. 2D data showed a possibility of ice crystal formation by having a fuzzy autocorrelation from the measured data. 3D data collection was carried out over 8 hours. We noticed a significant drift during 8 hour data collection during automatic rotation series and found out that ~ 1 hour automatic rotation series would keep the samples in the beam during rotation. We plan to implement series of segmented rotation data collection during next available beamtime to overcome the drift issue.

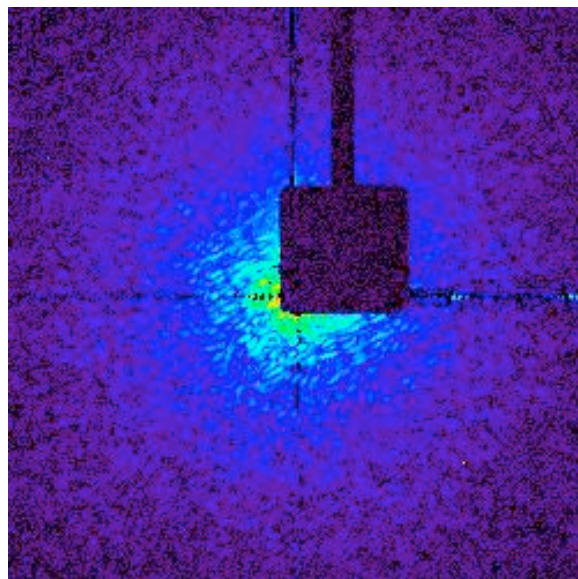


Figure 2. A speckle pattern from frozen-hydrated D. radiodurans.

