The myosin cross bridge is necessarily polymorphic: to understand muscle contraction one needs to understand how the shape of the cross bridge responds to the binding and hydrolysis of nucleotides (Raymont, Topic 04.13) and to the binding of actin. EM studies of the actomyosin complex show that the tail rotates on binding ADP (Milligan, Topic 04.13). Since the complex between myosin cross-bridge and monomeric actin has not been crystallised it is imperative to get high resolution data from cryo EM reconstructions. One method of extending the resolution is by the use of an energy-filter microscope. Images with a resolution of 15-20 Å have been obtained which allow a more detailed examination of the effect of actin-binding on the myosin cross-bridge. Fiber diffraction from orientated gels of decorated actin in the presence and absence of ADP can also be used to register changes in the actomyosin structure.

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Other

PS01.11.01 AN EFFICIENT AND CONVENIENT METHOD FOR RECORDING LOW TEMPERATURE X-RAY DIFFRACTION PHOTOGRAPHS. S. A. Chawdhury, Suvechcha 150/2, East Subidbazar, Sylhet 3100, Bangladesh.

An experimental technique has been developed for taking x-ray diffraction photographs within the range of gaseous nitrogen temperature. This technique has not only made possible the study of single crystals of interesting substances which are liquids or gases at room temperature and the phase change of certain compounds but also made possible a convenient means of increasing the quantity and improving the quality of intensity data. A metal dewar of special design, the outer tube of which is of stainless steel and the inner tube is of German silver, was constructed. It was then fitted to the specially constructed liquid nitrogen container and connected to the goniometer. A steady temperature anywhere from room temperature down to -183°C or so can be obtained.

PS01.11.02 THE Fddd DIFFRACTOMETER: HARDWARE INNOVATIONS AND A STUDY OF [Zn(H_2O)_6][C_6H_2(COOH)_2(COOH)_2]. R.C.B. Copley, a C.W. Lehmann, a J.A.K. Howard, a K. Wade, a G. Walker, a J.M. Archer, p and K.N. Treeblood, a a Dept. of Chemistry, University of Durham, Durham DH1 3LE, UK; b Institute Laue Langevin, BP 156X, F-38042 Grenoble, France; c Dept. of Chemistry and Biochemistry, UCLA, CA, 90024, USA.

The Fddd four-circle diffractometer has been developed to collect X-ray diffraction experiments at temperatures down to 9K and here we describe some hardware innovations and a study at five different temperatures on the compound (Zn(H_2O)_6)[C_6H_2(COOH)_2(COOH)_2](I). The diffractometer consists of: (i) a Siemens molybdenum rotating anode generator; (ii) Huber circles with offset chi; (iii) a Siemens Fast Scintillation Detector; and (iv) an APD '202' Displex cryogenic refrigerator.

The belt-driven rotating anode gives X-ray fluxes far superior to those obtained with a conventional X-ray tube. X-ray alignment requires precise movements of the 300 mm circle and this is achieved using air pads attached to the base of the goniometer. When activated with compressed air, the pads 'float' above the polished surface of an aluminium tabletop and allow precise movements of the circles.

The steel braided gas lines between the Displex and the helium compressor are supported by a counter balance system. The stress on these lines has been reduced by attaching them to the Displex via rotating joints and by passing them through a metal ring 30 cm above the Displex. The ring is supported by a frame work attached to the chi circle. A compact vacuum gauge has been mounted through one of the four ports on the top of the cryostat and gives interesting information on the vacuums obtained within the Displex during an experiment. Crystals are mounted on 'sharpened' 0.3mm graphite pencil leads and a new sample mount has been designed.

X-ray diffraction data for I have been collected at 296, 210, 120, 50 and 9K. Full analysis of the ADPs at the different temperatures demonstrates the high resolution capabilities of the Fddd diffractometer.