Laboratory Notes

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Rapid and precise method for preserving orientation in crystal transfer

The crystal to be studied is mounted on a goniometer head with modelling clay and aligned by one of the various X-ray techniques. For crystals less than 1 cm on edge the precession method is used, while back-reflection methods are needed for larger specimens. Once the sample is satisfactorily aligned the goniometer head is removed from the X-ray camera and screwed on a mounting with a $\frac{3}{8}$ inch diameter shaft (detail *A* in Fig. 1). The mounting together with the goniometer head and crystal, is inserted into the chuck of a drill press.

The crystal is now placed within the cavity of a cylindrical receiver (detail *B* in Fig. 1). This is a solid metal cylinder of brass, steel, *etc.* with a conical depression in the center of one end. The dimensions are not critical, but are typically about 1 inch in diameter and 1 inch high with a conical depression of $\frac{1}{4}$ inch deep with a semivertex angle of 45°. The depression is filled with molten wax; glycol phthalate, which softens at about 140°C, is suitable. The cylinder is placed on the drill-press table directly under the crystal. The crystal is lowered into the hot wax and locked down. The wax hardens in a matter of minutes as the cylinder is a good heat sink. The drill press is then raised, separating the crystal from the goniometer head. The crystal can now be cut or polished to give a face perpendicular to the desired direction. X-ray methods reveal that such faces are within about 1° of the desired orientation.

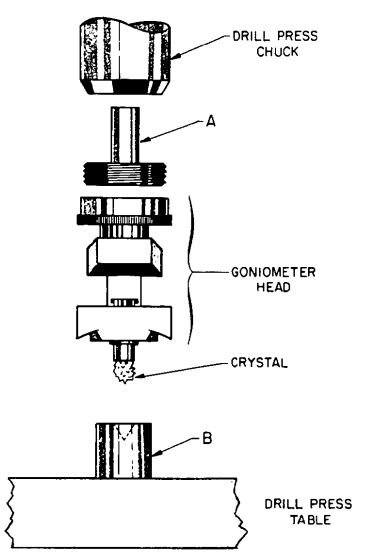

Fig. 1. Crystal-transfer apparatus.

The method is routinely employed to cut parallel faces in crystals for measurement of pyroelectric and piezoelectric coefficients. Crystals as small as 2 mm on edge have been successfully handled by this technique.

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A method for preventing crystal slippage in macromolecular crystallography

A new method for preventing crystal slippage in macromolecular single crystal X-ray diffraction is described which involves enclosing the crystal and its associated mother liquor with a very thin plastic film.

Crystal slippage during data collection has occasionally been an enigma in macromolecular single-crystal X-ray diffraction. In studies of southern bean mosaic virus type II rhombohedral crystals (Akimoto, Wagner, Johnson & Rossmann, 1975) slippage was a major problem in collecting the SBMV 3·5 Å resolution data until the procedure described here was adopted. The problem was accentuated as it was necessary to leave the crystals very wet in order to preserve diffraction to high resolution. In the case of satellite tobacco necrosis virus this problem was solved by growing the crystals in thin-walled capillaries until they were completely wedged between the walls (Åkervall & Strandberg, 1971).

Our solution to the slippage problem consists of enclosing the crystal and its associated mother liquor with a very thin plastic film after mounting. The plastic film was prepared *in situ* with a 0·2% solution of Poly(Vinyl Formal) 15/95 powder (Polyscience Inc., Warrington, Pa. 18976, USA) in 1,2-dichloroethane. This mixture, which is immiscible with water, will spread over an aqueous surface and leave a very thin plastic film when the solvent carrier evaporates.

The SBMV crystals were grown in microdialysis cells and mounted in the conventional manner by drawing the crystal into a thin-walled quartz capillary. The excess mother liquor was removed with either a thin glass rod or a narrow piece of filter paper. The crystal and its accompanying mother liquor were then coated with a thin film of plastic by drawing a short column (~1 mm) of the Poly(Vinyl Formal) solution over the crystal and subsequently allowing the solvent to dry for a few minutes. A small column of mother liquor was then drawn into the capillary which was sealed in the normal manner.

Crystals mounted by this procedure could be used immediately without observing any crystal slippage, whereas previously the crystals had to stand for at least 24 h before they could be used. There was also no detectable alteration in the background level or the diffraction pattern observed on the photograph.

This project was supported by the National Institutes of Health (grant No. AI 11219), National Science Foundation (grant No. BMS74-23537) and a supply grant from the Eli Lilly Co. In addition, DS was the recipient of a Deutsche Forschungsgemeinschaft postdoctoral fellowship.

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Crystallographers

This section is intended to be a series of short paragraphs dealing with the activities of crystallographers, such as their changes of position, promotions, assumption of significant new duties, honours, etc. Items for inclusion, subject to the approval of the Editorial Board, should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 13 White Friars, Chester CH1 1NZ, England).

Walter L. Bond, long a member of the American Crystallographic Association, died on 30 March 1977, after a second heart operation. He was widely known for his ingenuity and skill in designing and personally constructing a variety of in-

struments and tools for the study of crystals and the production of crystal devices. These included, for example, an automatic X-ray diffractometer and plotting device [*Acta Cryst.* (1954), **7**, 620; (1955), **8**, 741], a successful high-temperature powder diffraction camera [*Rev. Sci. Instrum.* (1958), **29**, 654), and an instrument for determining lattice constants to a few parts in 10^6 [*Acta Cryst.* (1960), **13**, 814].

A member of Bell Telephone Laboratories' research department for forty years, he retired in 1968 to spend nine productive years at Stanford University in California. During this time he wrote a compendium of useful information, techniques, and instrumentation for crystal work. The book is entitled *Crystal Technology* and was published by Wiley in 1976. In the same year Walter Bond was awarded the Longstreth Medal of the Franklin Institute. He is survived by his wife, Eunice.

Professor **B. A. Bilby**, Head of the Department of the Theory of Metals at Sheffield University, Dr **P. Duncumb,** Tube Investments Research Laboratories, Saffron Walden, Professor **G. N. Ramachandran,** Professor of Biophysics at the Indian Institute of Science, Bangalore, and Professor **J. M. Thomas,** Head of the Department of Chemistry at University College, Aberystwyth, have been elected Fellows of the Royal Society.

Professor **F. C. Frank,** lately Professor of Physics at Bristol University, has been made a Knight Bachelor.

Professor **S. Krimm** of the Physics Department at the University of Michigan, Ann Arbor, has been awarded the High Polymer Physics Prize of the American Institute of Physics.

Dr **T. M. Sabine,** Head of the School of Physics and Materials at the New South Wales Institute of Technology has been elected President of the Australian Institute of Physics.

Dr **J. N. Sherwood** has been appointed a personal professor in the Department of Pure and Applied Chemistry, University of Strathclyde, Scotland.

Professor **C. A. Taylor,** Professor of Physics at University College, Cardiff, has been appointed Professor of Experimental Physics at the Royal Institution, London.

Professor **B. K. Vainshtein,** Director of the Institute of Crystallography of the Academy of Sciences of the USSR, in Moscow, and Vice-President of the International Union of Crystallography, has been elected a full member (Academician) of the Academy of Sciences of the USSR in recognition of his contributions to physics and crystallography.

International Union of Crystallography

Structure Reports

Volumes 40B and 41A of *Structure Reports* have recently been published. Volume 40B, covering the literature for organic compounds for 1974, is bound in two parts (viii + 582 pages and ii + 645 pages) and costs 320 Netherlands guilders. Volume 41A, covering the literature for metals and inorganic compounds for 1975, (viii + 477 pages) costs 150 Netherlands guilders. A 47-page supplement for 1974–1975 to Section A (*Metals and Inorganic Compounds*) of the 60-*Year Structure Index* is being sold with Volume 41A, and is included in the price for that volume. Additional copies of the supplement are available at a price of 10 Netherlands guilders.

Orders for these publications may be placed direct with the publisher, Bohn, Scheltema & Holkema, Emmalaan 27, Utrecht, The Netherlands, with Polycrystal Book Service, PO Box 11567, Pittsburgh, PA 15238, USA, or with any bookseller.

World Directory of Crystallographers: Fifth Edition

The Fifth Edition of this most useful Directory has just been published on behalf of the International Union of Crystallography by Polycrystal Book Service, PO Box 11567, Pittsburgh, Pennsylvania 15238, USA, from whom copies may be ordered direct at a price of US $10.00 post free. It contains short biographical data on 7641 scientists from 71 countries, arranged in alphabetical order by countries, and by individuals within the countries. The biographical data include full name and title, address, year of birth, highest degree, field of study, university and year of highest degree, present position, telephone number and major scientific interests. There is also a comprehensive name index.

The General Editor of the Directory is Dr S. C. Abrahams and the Associate Editor is Dr A. L. Bednowitz. Crystallographers have completed Data Input Forms and have submitted them to the national Sub-Editors. The Directory has been produced by a computer-controlled experimental printer from punched cards or magnetic tapes prepared by the Sub-Editors. All National Committees for Crystallography, and also all Sub-Editors for countries not represented in the Union but included in the Directory, have been given the opportunity to compile block orders for copies at a specially reduced price. These orders had to be submitted before the Directory was printed, but many countries took this opportunity to secure low-priced copies of the Directory for the personal use of their crystallographers.

Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 13 White Friars, Chester CH1 1NZ, England).

Crystal Growth Award of the American Association for Crystal Growth

The establishment of a new award for 'outstanding contributions to the field of crystal growth' was announced at Boston, Massachusetts, on 21 July 1977 by the American Association for Crystal Growth (AACG), at the Fifth International Conference on Crystal Growth. The Crystal Growth Award of the AACG, supported by the Union Carbide Corporation, will consist of a certificate citing the contributions for which the Award is given, a medal and an honorarium of $3000.

The Award, to be presented triennially at the AACG's national meetings, will be given first in 1978. It may be shared by more than one individual, and the recipient(s) will be invited to deliver a lecture during the course of the ceremony. The basic criterion for eligibility is outstanding contributions to the field of crystal growth, through technical achievements, publications and presentations, and their impact on science and technology in crystal growth worldwide. Those selected need not be citizens of the United States. Nominations, together with concise supporting documentation, should be for-