Meetings

X-RAY AND ELECTRON DIFFRACTION

EIGHTH ANNUAL PITTSBURGH CONFERENCE

The Pittsburgh diffraction conferences are organized by an independent committee of scientists actively interested in the theory, techniques, and applications of diffraction. The 1950 conference, which was held at Mellon Institute on November 2 and 3, was characterized by a record number of registrants (183) from all parts of the United States and abroad, a full but not too hurried program of papers, and generally vigorous participation of the audience in the discussions.

The meetings were highlighted by the contributions of three French scientists. André Guinier of the Sorbonne, Université de Paris, delivered the evening lecture on Thursday on the subject "European Advances in High Intensity X-Ray Diffraction" before a joint meeting of the conference with the Pittsburgh Physical Society. Professor Guinier described recent refinements in the design of rotating anode tubes and he also explained the advantages obtainable from fine-focus tubes. The use of such tubes makes practicable the general employment of crystal monochromatized radiation, and it should prove a powerful fundamental research tool in the investigation of lattice imperfections. Effective gains in intensity of up to 50 fold can be hoped for with the efficient utilization of fine-focus tubes. Professor Guinier's talk impressed the audience with the great possibilities of these innovations in diffraction techniques, which have to date received little attention in America.

The regular program of papers took the form of symposia on special fields, in addition to which some general papers were included. K. L. Yudowitch of the Florida State University deserves much credit for arranging an outstanding program on small angle scattering. Professor Guinier, a world authority in this field, described studies made on egg yolk in his laboratory which reveal crystalline components in the yolk which would not be suspected from the large angle scattering of the material. It appears that studies of this type would be important in other biological fields. An outstanding presentation was Otto Halpern's (University of Southern California) theoretical discussion of the small angle scattering of neutrons, in which he pointed out that magnetic double refraction is much greater than in ordinary optics and, therefore, of special consequence in experimental work. D. Meneghetti (Argonne National Laboratory) gave experimental data on the angular widths of the scattering of neutrons by aluminum, $CaCO_3$, and lampblack, which showed good agreement with theoretical expectations. A paper from O. Kratky of the University of Graz described recent advances in the technique and interpretation of small angle x-ray scattering. R. L. Wild (University of North Dakota) showed how the small angle scattering of x-rays from nitrogen near its critical point can be used to obtain values of the isothermal compressibility and the sizes of regions of inhomogeneity. A report was given on new point focusing x-ray monochromators now being constructed at the California Institute of Technology by J. W. M. DuMond and associates. L. Stone and K. L. Yudowitch (Florida State University) explained the construction of a high resolution, small angle vacuum camera by means of which $CrK\alpha$ radiation can be used to study particles as large as one-third micron. Other interesting papers were given on the small angle scattering of x-rays by synthetic organic polymers, hemoglobin, and collagen.

Great interest was shown in the symposium on silicates. W. F. Bradley utilized the reciprocal lattice concept to explain the specific diffraction patterns generated by various arrangements of the layers in layer silicates. G. Talvenheimo described progress made in evolving a scheme for the quantitative analysis of clay minerals. Studies on amorphous intermediate stages obtained after the dehydration of clays and other hydrous silicates were discussed by H. F. McMurdie, while W. R. Foster explained how solid state reactions in the MgO-ZrO_2-SiO_2 system could be used to establish the solidus phase equilibrium diagram. E. A. Gulbransen concluded the session with a report on the decomposition of FeO in oxide films and scales on iron as studied with the high temperature electron diffraction camera. A mechanism for the decomposition was proposed which involves the nucleation and growth of Fe and Fe_3O_4 crystals in the FeO lattice.

A session on instrumentation, methods, and techniques has become a traditional part of the Pittsburgh diffraction conference. In the present instance, Mlle. Yvette Cauchois of the Sorbonne, Université de Paris, presented an authoritative discussion of improvements in bent-crystal techniques and applications, much of it based on her years of experience in this field. It was pointed out that mica, quartz, gypsum, topaz, and calcite can all be used as elastically bent crystals for concentrating x-ray beams. Such crystals yield the sharp lines so necessary in x-ray spectroscopy. One may also use plastically bent single crystals of aluminum for monochromatizing purposes where high intensity is the chief aim. Two papers dealt with the Geiger counter in single crystal intensity measurements. Howard T. Evans, Jr., Philips Laboratories, Inc., demonstrated the use of a Geiger counter for Weissenberg intensity measurements, while Ray Pepinsky, Pennsylvania State College, described the development of special proportional counters for the measurement of small intensities. L. S. Birks, Naval Research Laboratory, reported the improvements in x-ray fluorescence analysis obtained by vacuum techniques which permit extending the range of analysis from calcium down to the next row of lighter elements in the periodic table. Other papers presented new optical methods in Fourier computations and demonstrated the use of precise lattice constants for the determination of linear expansion coefficients and atomic weights of the elements.

The symposium on metals was opened by two papers from the well known group with Professor Warren at the Massachusetts Institute of Technology. The first given by Mr. Norman dealt with the problem of short range order in single crystals of silver-gold alloys. This was a continuation of the very beautiful work done previously on other alloys by Professor Warren's students. The next paper, by Mr. Cole, dealt with an interrelation between temperature diffuse scattering and elastic constants in β-brass. A. H. Geisler and S. E. Steigert discussed the very complicated phenomena occurring during precipitation in an Fe-Mo-Co alloy. The nature of these effects is now a much discussed subject. J. T. Norton of MIT explained some of the difficulties which must be solved in selecting elastic constants for the calculation of stresses from x-ray measurements; it was indicated that it is difficult to correlate the x-ray data with stresses measured by more conventional methods. Precision lattice constant measurements using molybdenum radiation was the subject of a paper by R. D. Johnson and

Charles Smith. Finally Ling Yang described in detail some of his excellent work by means of electron diffraction on the relationship of electro-deposited antimony on antimony single crystals. The experimental results seem to be in agreement with theoretical investigations. The diversity of subject matter in this symposium indicated the well known wide range of applicability of x-ray and electron diffraction to some of the most basic phenomena occurring in metals.

Following the metals session on Friday, an informal round table discussion was held on the cementation of iron; Paul H. Emmett acted as moderator. This meeting was opened with a report of researches by electron diffraction on the cementation of steel by J. J. Trillat of the Sorbonne, Université de Paris. The European results on iron cementation were compared with American work and discussed by L. J. Hofer, Dr. Emmett, Dr. Gulbransen, and others. The success of this round table meeting prompted several persons to ask that simliar sessions be held at future conferences.

The weightier business of the conference was relieved by activities in a lighter vein. 122 diners at the annual banquet Thursday evening were treated to inimitable renditions by the Sextet from Laue of "The Battle Hymn of the Listener" and "The Conference Theme Song", the refrain of which haltingly pursued the notes of "My Darling Clementine":

O electron, x-ray photon,
Theta values come to mind,
Curving crystals, coefficients,
X-ray tubes of every kind.

Musical appetites not entirely appeased by this classical performance were satisfied later in the evening by a brief but most enjoyable appearance of the renowned Westinghouse Male Quartet.

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Mellon Institute of Industrial Research

MEETINGS TO BE HELD

AIEE WINTER MEETING

Sixty technical sessions dealing with advances in the field of electricity and allied arts will be held at the Winter General Meeting of the American Institute of Electrical Engineers in the Hotel Statler, New York, Jan. 22–26. The meeting, largest of several held yearly by the Institute, is expected to attract several thousand engineers and scientists from all parts of the country. G. J. Lowell of the General Electric is General Chairman.

MOLECULAR STRUCTURE AND SPECTROSCOPY

A symposium on molecular structure and spectroscopy will be held at the department of physics of the Ohio State University from June 11th to June 15th. There will be discussions of the interpretation of molecular spectroscopic data as well as methods for obtaining such data. In addition, there will be sessions devoted to those phases of spectroscopy of current interest. A dormitory will be available for those who wish to reside on the campus during the meeting. For further information, or for a copy of the program when it becomes available, write to Professor Harald H. Nielsen, Department of Physics, the Ohio State University, Columbus 10, Ohio. The symposium will be sponsored this year jointly by the graduate school and the department of physics and astronomy at Ohio State and by the American Physical Society's division of chemical physics.

PETROLEUM CONGRESS IN HOLLAND

The third World Petroleum Congress is to be held from May 28th to June 6th, this year, at The Hague, Netherlands; plans for the program have already been completed. The national committee for the international congress representing the United States includes among its members E. V. Murphee of Standard Oil Development Co., F. S. Clulow of Shell Oil Co., Paul D. Foote of Gulf Research & Development Co., K. G. Mackenzie of the Texas Co., Earl Bartholomew of Ethyl Corporation, and W. F. Faragher of the Houdry Process Corporation. Further information may be obtained by writing to the secretary of the U. S. committee, K. G. Mackenzie, 135 East 42nd Street, New York 17, N. Y.

EMULSIONS COLLOQUIUM IN FRANCE

Plans have been announced for a 1951 colloquium to be held in Paris from September 24 through September 29 which will deal with sensitive emulsions and their physical and physical-chemical properties. The meeting is to be held under the joint sponsorship of the University of Paris, the Paris Faculty of Sciences, and the French National Center of Scientific Research. According to present information, the program will mainly deal with the physical-chemical properties of silver halides, the sensitivity of emulsions and optical sensitivity, development, and nuclear emulsions.

In order to increase interest in the meeting, its organizers have indicated a desire to send in advance to all participants a substantial résumé of the papers to be presented. This will be possible if authors will submit their papers not later than June 1951 so that sufficient time may be allowed for translation and printing. Communications should be addressed to Madame A. Vassey, Faculté des Sciences de Paris, rue Victor Cousin, Paris 5e.

AIP ANNIVERSARY MEETING

The twentieth (china) anniversary celebration of the founding of the American Institute of Physics is to take place in Chicago from the 23rd to the 27th of October, during which period each of the Institute's five member societies will hold meetings. In addition, it is planned that there be an all-day symposium formed about the theme of "physics today", as distinguished from yesterday or tomorrow, which will constitute a survey of current knowledge in the various branches of the field.

An organizing committee headed by Paul E. Klopsteg is currently active in laying plans for the celebration. The Physical Society is represented on this committee by K. K. Darrow, the Optical Society by A. C. Hardy, the Acoustical Society by J. C. Steinberg, the Society of Rheology by W. W. Willets, and the Association of Physics Teachers by Dr. Klopsteg. J. C. Boyce and E. H. Land are members at large.

SPECTROSCOPY IN THE STEEL INDUSTRY

The American Association of Spectrographers has announced that a symposium on the "Use of Spectroscopy in the Steel Industry" is to be held in Chicago in May 1951. Papers from members or non-members, on any phase of the subject, are invited. Titles of contributions should be in the hands of the Chairman of the Symposium Committee, Ralph H. Steinberg, 9531 Avalon Ave., Chicago 28, Ill., at the earliest possible date.