driving forces, and intermediate values of contact angle.

F. P. Price (General Electric Research Laboratory) discussed nucleation and growth of single-crystal organic polymers, and presented evidence that classical nucleation theory applies equally satisfactorily to polymer crystals and to materials of low molecular weight. Specifically, it was shown (i) that the thermal history of organic solids controls the size of crystalline spherulites and (ii) that for polychlorotrifluoroethylene there is correlation between spherulite size and fatigue life. In particular, rapid quenching results in small crystals, capable of greater reverse bending before fracture occurs; whereas slow cooling creates crystals of such size that single bending causes failure. The stress-strain curves of polypropylene exhibited similar characteristics but, through annealing for increased periods of time, the total possible elongation can be reduced. This in turn possibly results in immediate fracture after the initial upper yield.

P. G. Shewmon (Carnegie Institute of Technology) introduced the subject of surface diffusion with an examination of the experimental techniques used in the determination of the surface diffusion coefficient D_s. The controversy as to whether volume or surface diffusion plays the major role in the process of fine powder sintering was then explored. Shewmon suggested that surface diffusion is the all-important factor to be considered, contrary to the conclusions arrived at in most of the literature on this subject. Recent extensive computer studies, however, substantiate this minority belief, he pointed out. The basic argument was developed as an extension of the observed results of scratch smoothing experiments; these experiments showed the wavelength of a grating surface to be an important parameter in the determination of the ratio of surface to bulk diffusion.

C. E. Birchenall and J. M. Williams (University of Delaware) took the general position that these subjects—surface diffusion, surface diffusion versus bulk diffusion, and the relation of these to the sintering process—were more complex and should be more closely considered. Among the factors that should be examined, for example, in any consideration of surface diffusion are surface impurity size and distribution, crystalline anisotropies, divacancy migration through the surface, the long mean free paths at high temperatures, and the chemical effects that "pin" atoms to adsorbed species. Commenting particularly on the sintering process, Birchenall and Williams thought that neck size, not particle size, as is usually thought, was more important in a determination of a surface diffusion mechanism. They also discussed tracer technique experiments which they had been performing recently. The conclusion, however, was that the end results of these experiments might not shed any more light on these general problems than presently existed.

J. M. Blakely and C. Y. Li (Cornell University) discussed the formation of surface point defects on ionic crystals and showed that about 2.12 ev of energy is required to create a divacancy on a (100) NaCl crystal surface, compared to 1.95 ev for the creation of a similar double effect in the bulk material. The legitimacy of the use of the bulk dielectric constant in the neighborhood of a surface was questioned. It was pointed out that a correction to this value would have the effect of increasing the polarization component of the removal energy, thus making it more difficult to create a surface defect pair.

I. R. Kramer (Martin Company) spoke on surface-initiated failures in structural materials. His basic premise was that the mechanical behavior of materials, particularly metals, is markedly affected by the surface; that all of the usual mechanical properties—tensile behavior, fatigue, creep, stress-rupture—can be altered by suitable surface changes. For example, copper-plated zinc crystals reduce creep rate to negligible values. It was also pointed out that various atmospheres produce different and readily observable effects on materials. For example, specimens tested in vacuum are able to deform plastically more readily than those tested in air.

J. Turkevich (Princeton University) spoke broadly on the subject of ultra-fine particles in gases. Regarding the nucleation, growth, and aggregation of fine aerosol particles he suggested that their formation and also their texture are due to a certain degree of information or memory in an organized aggregate of materials. His view has been documented by electron-microscopy examinations of particles in a finely divided state. Other unusual characteristics of the growth of such particles in gases are that, in contrast to the case of crystallites, there are no driving forces to promote growth, and that these particles are so nearly perfect that the so-called "growth sites" associated with dislocations are not found to exist. It was explained that in the preparation of such fine particles it was always necessary to perform some preliminary burning off of debris (carbon). This burning is not as simple a task as might be presumed, because the burning rate—dependent on surface area—will decrease as the particles become smaller. Another problem associated with the formation of such fine particles is the dissipation of the energy generated at the surface. Usually this is accomplished through absorption by the "bulk." With such fine particles, however, there is usually no bulk; thus the carbon burning cannot be sustained. Room-temperature burning, using oxygen produced in a discharge tube, however, can be accomplished to a finer degree, and no side effects are introduced into the materials from which the carbon is removed. Next, it was explained that, contrary to usual belief, magnesium atoms do not aggregate to form well-defined hexagonal crystals. With the addition of small amounts of copper impurities, crystal growth is promoted and such perfect hexagons do appear. In closing, it was shown that there is a very practical application of these aerosol studies—namely, the use of fine particle technology in the study of radioactive fallout.

The sponsor of the symposium was the Ilikon Corporation, Natick Industrial Center, Natick, Massachusetts. A symposium volume is being prepared; requests for copies should be addressed to Ilikon Corporation.

L. J. BONIS

Ilikon Corporation,
Natick, Massachusetts

Forthcoming Events

December

26–31. **American Assoc. for the Advancement of Science**, annual, Berkeley, Calif. (R. L. Taylor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C.)

In addition to the 20 sections of the Association and five AAAS committees, the following organizations have arranged sessions at the AAAS annual meeting:

Mathematics

American Mathematical Soc. (R. S. Pierce, Univ. of Washington, Seattle)

Association for Computing Machinery. (H. D. Huskey, Univ. of California, Berkeley)

National Council of Teachers of Mathematics. (J. D. Gates, 1201 16 St., NW, Washington, D.C.)

Society for Industrial and Applied Mathematics. (J. H. Griesmer, IBM, Yorktown Heights, N.Y.)

Physics

American Astronautical Soc. (P. B. Richards, General Precision, Little Falls, N.J.)

Chemistry

American Chemical Soc., California Section. (R. L. LeTourneau, Chevron Research Co., Richmond, Calif.)

Astronomy

American Astronomical Soc. (G. C. McVittie, Univ. of Illinois, Urbana)

Geology and Geography

Association of American Geographers. (M. Mikesell, Univ. of Chicago, Chicago, Ill.)

National Geographic Soc. (R. Gray, 17th & M Sts., NW, Washington, D.C.)

National Speleological Soc. (G. W. Moore, U.S. Geological Survey, Menlo Park, Calif.)

Zoological Sciences

American Fisheries Soc. (H. K. Chadwick, California Dept. of Fish and Game, Sacramento)

American Soc. of Zoologists. (A. G. Richards, Univ. of Minnesota, St. Paul)

Animal Behavior Soc. (E. M. Banks, Univ. of Illinois, Urbana)

Herpetologists' League. (F. B. Turner, Univ. of California, Los Angeles)

Society of Systematic Zoology. (J. G. Rozen, Jr., American Museum of Natural History, New York, N.Y.)

Zoological and Botanical Sciences

American Soc. of Naturalists. (C. Hubbs, Scripps Inst. of Oceanography, La Jolla, Calif.)

Ecological Soc. of America. (G. M. Woodwell, Brookhaven Natl. Laboratory, Upton, L.I., N.Y.)

Western Soc. of Naturalists. (J. M. Craig, San Jose State College, San Jose, Calif.)

Psychology

Western Psychological Assoc. (G. A. Mendelsohn, Univ. of California, Berkeley)

Social and Economic Sciences

American Economic Assoc. (R. R. Nelson, RAND Corp., Santa Monica, Calif.)

American Political Science Assoc. (J. F. Triska, Stanford Univ., Stanford, Calif.)

American Soc. of Criminology. (C. Newman, Univ. of Louisville, Louisville, Ky.)

American Sociological Assoc. (W. Form, Michigan State Univ., East Lansing)

Metric Assoc. (R. Fischelis, Ohio Northern Univ., Ada)

National Inst. of Social and Behavioral Science. (D. P. Ray, 863 Benjamin Franklin Station, Washington, D.C.)

Population Assoc. of America. (E. S. Lee, Univ. of Pennsylvania, Philadelphia)

Society for the Scientific Study of Religion. (C. Y. Glock, Univ. of California, Berkeley)

History and Philosophy of Science

Philosophy of Science Assoc. (C. W. Churchman, Univ. of California, Berkeley)

Society for General Systems Research. (H. Thal-Larsen, Univ. of California, Berkeley)

Science Courses for Baccalaureate Education Project. (V. L. Parsegian, Rensselaer Polytechnic Inst., Troy, N.Y.)

Medical Sciences

Alpha Epsilon Delta. (M. L. Moore, 7 Brookside Circle, Bronxville, N.Y.)

American Assoc. of Bioanalysts, Western Region. (M. Menesini, 1287 Rudgear Rd., Walnut Creek, Calif.)

American Physiological Soc. (R. M. Iverson, Univ. of Miami, Coral Gables, Fla.)

American Soc. for Microbiology, Northern California–Hawaiian Branch. (K. J. Taylor, Cutter Laboratories, Berkeley, Calif.)

California Veterinary Medical Assoc. (A. G. Edward, Univ. of California, Davis)

Society for Experimental Biology and Medicine, Pacific Coast Section. (E. L. Dobson, Donner Laboratories, Univ. of California, Berkeley)

Education

Commission on Science Education. (J. R. Mayor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

American Nature Study Soc. (H. E. Weaver, Univ. of Illinois, Urbana)

National Assoc. for Research in Science Teaching. (F. B. Dutton, Michigan State Univ., East Lansing)

National Assoc. of Biology Teachers. (H. K. Wong, Menlo-Atherton High School, Atherton, Calif.)

National Science Teachers Assoc. (A. F. Eiss, 1201 16 St., NW, Washington, D.C.)

Information and Communication

National Assoc. of Science Writers. (L. S. Zahn, Hill and Knowlton Inc., 150 E. 42 St., New York, N.Y.)

Society of Technical Writers and Publishers. (G. Marx, Illinois Inst. of Technology, Chicago)

Statistics

BIO: Biomedical Information-Processing Organization. (M. Woodbury, New York Univ. Medical Center, New York, N.Y.)

Biometric Soc., ENAR. (D. S. Robson, Cornell Univ., Ithaca, N.Y.)

Biometric Soc., WNAR. (S. W. Nash, Univ. of British Columbia, Vancouver, Canada)

Mathematical Statistics and Probability, 5th Berkeley symp. (J. Neyman, Statistical Laboratory, Univ. of California, Berkeley)

Science in General

Academy Conf. (J. T. Self, Univ. of Oklahoma, Norman)

Scientific Research Soc. of America. (D. B. Prentice, 51 Prospect St., New Haven, Conn.)

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Sigma Delta Epsilon. (Miss A. Hanson, Univ. of Minnesota, Minneapolis)

Society of the Sigma Xi. (T. T. Holme, 51 Prospect St., New Haven, Conn.)

27–29. Academy of **Management**, New York, N.Y. (P. P. LeBreton, College of Business Administration, Univ. of Washington, Seattle)

27–30. **Differential Equations and Dynamical Systems.** Univ. of Puerto Rico, Mayaguez. (Center for Dynamical Systems, Brown Univ., Providence, R.I.)

27–30. **Phi Delta Kappa**, Professional Education Fraternity, Univ. of Oklahoma, Norman. (M. Bemis, Phi Delta Kappa, 8th and Union, Bloomington, Ind. 47402)

28–30. Indian **Medical** Assoc., 41st conf., Baroda (Gujarat). (Indian Medical Assoc. House, Indraprastha Marg., New Delhi 1)

29–4. **Pugwash Conf. on Science and World Affairs**, Addis Ababa, Ethiopia. (J. Rotblat, Pugwash Continuing Committee, 8 Asmara Rd., London, N.W.2, England)

January

4–7. **Solid State Physics**, conf., Manchester College of Science and Technology, Manchester, England. (S. F. Edwards, Dept. of Physics, Victoria Univ. of Manchester, Manchester 13)

5–8. National Soc. of **Professional Engineers**, winter mtg., Bal Harbour, Fla. (NSPE, 2029 K St., NW, Washington, D.C. 20006)

6–7. Society for **General Microbiology**, 45th general mtg., London, England. (P. H. Clarke, Biochemistry Dept., University College, Gower St., London, W.C.1)

6–10. International Council of **Scientific Unions**, 11th general assembly, Bombay, India. (Intern. Council of Scientific Unions, Via Sebenico 2, Rome, Italy)

7–8. **Surgical Research** Soc., winter mtg., London, England. (A. P. M. Forrest, Cardiff Royal Infirmary, Newport Rd., Cardiff, Wales)

10–13. **Radioactive Isotopes** in Clinical Medicine and Research, 7th intern. symp., Bad Gastein, Austria. (R. Hofer, Second Medical Univ. Clinic, Garnisongasse 13, Vienna 9)

11–12. Man's Extension into the **Sea**, symp. on SEALAB II, Washington, D.C. (T. Evans, Conference Management Organizer, Colonial Bldg., 105 N. Virginia Ave., Falls Church, Va. 22046)

12–14. **Medicinal and Aromatic Plants in India**, symp., Central Indian Medicinal Plants Organization, Lucknow, India. (S. C. Datta, CIMPO, 4 Sapru Marg, Lucknow)

12–20. International **Fertility** Assoc., Latin American mtg., Acapulco, Mexico. (M. Roland, 109-23 71st St., Forest Hills, N.Y. 11375)

13–14. Institute of **Mathematical Sciences**, 4th Matscience anniversary symp., Madras, India. (C. P. Ramaswami Aiyer, Inst. of Mathematical Sciences, Madras)

13–16. Indian Institute of **Metals**, 19th annual mtg., Hyderabad. (The Institute, 31 Chowringhee Road, Calcutta 16)

16–21. American **Chemical** Soc., winter mtg., Phoenix, Ariz. (ACS, 1155 16th St., NW, Washington, D.C. 20036)

17–19. **Labelled Proteins in Tracer Studies**, conf., Pisa, Italy. (Euratom, Labelled Compounds Div., 51-53, rue Belliard, Brussels, Belgium)

19–21. **Instrumentation** for the Process Industries, Texas A&M symp., College Station. (P. T. Eubank, Dept. of Chemical Engineering, Texas A&M Univ., College Station)

20–21. Anharmonic **Phonon Interactions** in Solids, Princeton Univ., Princeton, N.J. (W. B. Daniels, Dept. of Solid State Sciences, Princeton Univ., N.J.)

20–22. Regulation of **Antibody Response**, intern. symp., Toronto, Ont., Canada. (B. Cinader, Subdivision of Immunochemistry, Univ. of Toronto, Toronto, Ont.)

20–22. **Diabetes** in the Tropics, world congr., Bombay, India. (Organizing Secretary, Diabetic Assoc. of India, Maneckji Wadia Bldg., Mahatma Gandhi Rd., Bombay 1)

20–22. **Symmetry Principles at High Energy**, conf., Univ. of Miami, Coral Gables, Fla. (D. R. Lehman, Air Force Office of Scientific Research, Tempo D, 4th and Independence Ave., SW, Washington, D.C.)

21–22. Physiology of **Hemostasis and Thrombosis**, 14th annual Wayne State Univ. symp. on blood, Detroit, Mich. (W. H. Seegers, Dept. of Physiology and Pharmacology, Wayne State Univ., Detroit)

22–27. American Acad. of **Orthopedic Surgeons**, Chicago, Ill. (J. K. Hart, 29 E. Madison, Chicago 2)

23–28. American **Library** Assoc., midwinter mtg., Chicago, Ill. (D. H. Clift, ALA, 50 E. Huron St., Chicago 60611)

24–26. **Aerospace Sciences**, 3rd mtg., American Inst. of Aeronautics and Astronautics, New York, N.Y. (AIAA, 1290 Sixth Ave., New York 10019)

24–27. Modern Methods of **Analytical Chemistry**, 19th annual, Louisiana State Univ. symp., Baton Rouge. (P. W. West, LSU, Baton Rouge)

24–27. American Soc. of **Heating, Refrigerating, and Air-Conditioning Engineers**, semiannual mtg., Houston, Tex. (ASHRAE, 345 E. 47 St., New York)

24–27. American **Meteorological Soc.**, 46th annual mtg., Denver, Colo. (K. C. Spengler, AMS, 45 Beacon St., Boston, Mass.)

24–28. Animal and Clinical **Pharmacologic Techniques in Drug Evaluation**, part 1, mtg., Philadelphia, Pa. (J. H. Nodine, Hahnemann Medical College and Hospital, 230 N. Broad St., Philadelphia 19102)

24–30. **CNS–Drugs**, symp., Regional Research Laboratory, Hyderabad, India. (P. B. Sattur, Regional Research Laboratory, Hyderabad 9)

25. Research and Industrial Applications of the **Mössbauer Effect**, New York, N.Y. (M. Ress, New England Nuclear Corp., 575 Albany St., Boston, Mass.)

25–27. **Reliability**, 12th annual symp., Inst. of Electrical and Electronics Engineers, San Francisco, Calif. (A. R. Park, General Precision Inc., 1378 Encinatas Rd., San Marcos, Calif.)

26. Current and Future Problems in **Chemistry at High Temperatures**, Rice Univ., Houston, Tex. (M. A. Paul, Div. of Chemistry and Chemical Technology, National Acad. of Sciences, Washington, D.C. 20418)

26–27. **Sulfur**, symp., Wilson Dam, Ala. (V. J. Kilmer, Div. of Agricultural Development, Tennessee Valley Authority, Wilson Dam 35661)

26–28. **Light Nuclei**, symp., Lyon, France. (R. Radvanyi, Lab. Joliot-Curie de physique nucléaire, Faculté des Sciences, B.P. 1, Orsay, France)

26–28. **Mathematical** Assoc. of America, 49th annual mtg., Chicago, Ill. (H. M. Gehman, State Univ. of New York, Buffalo 14214)

26–29. American **Physical** Soc., annual mtg., New York, N.Y. (K. K. Darrow, APS, 335 E. 45 St., New York 10017)

26–29. American Assoc. of **Physics Teachers**, annual mtg., New York, N.Y. (M. Phillips, Ryerson Physical Laboratory, Univ. of Chicago, Chicago, Ill. 60637)

27–29. American **Group Psychotherapy** Assoc., Philadelphia, Pa. (AGPA, 1790 Broadway, New York 10019)

27–29. International **Medical Assembly** of Southwest Texas, San Antonio. (S. E. Cockrell, Jr., 202 W. French Pl., San Antonio 78212)

28–4. **Medical Ethics**, seminar, London, England. (E. F. Shotter, Ciba Foundation, 41 Portland Pl., London, W.1)

30–4. Institute of **Electrical and Electronics Engineers, Power Group**, winter mtg., New York, N.Y. (E. C. Day, IEEE, 345 E. 47 St., New York 10017)

30–4. American Soc. for **Testing and Materials**, spring mtg., Washington, D.C. (T. A. Marshall, ASTM, 1916 Race St., Philadelphia 3, Pa.)

31–2. **Information Theory**, intern. symp., Inst. of Electrical and Electronics Engineers, Univ. of California, Los Angeles. (A. V. Balakrishnan, Dept. of Engineering, Univ. of California, Los Angeles 90024)

31–2. Solid Propellant **Rockets**, 7th conf. (American Inst. of Aeronautics and Astronautics, 1290 Sixth Ave., New York 10019)

31–3. Scientific Aspects of **Pest Control**, symp., Washington, D.C. (Agricultural Board, National Academy of Sciences, 2101 Constitution Ave., NW, Washington 20418)

February

2–4. **Aerospace and Electronic Systems**, winter conv., Inst. of Electrical and Electronics Engineers, Los Angeles, Calif. (A. S. Jerrems, Aerospace Group, Hughes Aircraft Co., Culver City, Calif.)

2–6. American College of **Cardiology**, Chicago, Ill. (W. D. Nelligan, 9650 Rockville Pike, Bethesda, Md. 20014)

3–4. American **Chemical Soc.**, 1st Middle Atlantic regional mtg., Philadelphia, Pa. (Philadelphia Section Office, ACS, 212 Harrison Laboratory, 34th and Spruce St., Philadelphia 19104)

3–9. **Medical Education**, congr., Chicago, Ill. (W. S. Wiggins, 535 N. Dearborn St., Chicago 60610)

6–9. American Inst. of **Chemical Engineers**, Dallas, Tex. (The Institute, 345 E. 47 St., New York 10017)

7–8. Perspectives in **Virology**, 5th mtg., New York, N.Y. (M. Pollard, Lobund Laboratory, Notre Dame, Ind.)

7–9. **Reactor Physics** in the Resonance and Thermal Regions, mtg., San Diego, Calif. (G. Joanou, General Atomic Corp., P.O. Box 1111, San Diego, 92112)

7–18. World **Meteorological Organization**, regional assoc. #5, 4th session, Wellington, New Zealand. (WMO, 4 Avenue, Giuseppa Motta, Geneva, Switzerland)

8–9. **Cost Aspects of Water Supply**, 8th sanitary engineering conf., Urbana, Ill. (J. H. Austin, 203 Civil Engineering Hall, Univ. of Illinois, Urbana 61803)

9–11. **Solid State Circuits**, 13th annual conf., Philadelphia, Pa. (K. H. Fischer, U.S. Army Electronics Command, Attn: AMSEL-KL-I, Fort Monmouth, N.J. 07703)

10–11. **Snow**, eastern conf., Hartford, Conn. (G. Ayer, P.O. Box 948, Albany 1, N.Y.)

10–12. **Intermediate Energy Physics**, conf., College of William and Mary, Williamsburg, Va. (R. T. Siegel, Physics Dept., College of William and Mary, Williamsburg 23185)

14–16. **Transplantation**, 7th intern. conf., New York Acad. of Sciences, New York, N.Y. (F. T. Rapaport, New York Univ. Medical Center, 550 First Ave., New York 10016)

14–18. Society of **Economic Geologists**, New York, N.Y. (J. O. Kalliokoski, Dept. of Geology, Princeton Univ., Princeton, N.J. 08540)

16–18. Practical **Space Applications**, symp., San Diego, Calif. (C. Tross, Box 931, Rancho Santa Fe, Calif.)

16–19. National Soc. of **College Teachers of Education**, Chicago, Ill. (E. H. Goldenstein, Administration Bldg., 413, Univ. of Nebraska, Lincoln 68508)

16–19. Institute of **Management Sciences** annual mtg., Dallas, Tex. (W. M. Campbell, Atlantic Refining Co., P.O. Box 2819, Dallas 75221)

17–19. American **Educational Research** Assoc., Chicago, Ill. (R. A. Dershimer, The Association, 1201 16th St., NW, Washintgon, D.C. 20036)

18–20. American **Psychopathological** Assoc., symp., New York, N.Y. (F. A. Freyhan, The Association, Natl. Inst. of Mental Health, c/o St. Elizabeths Hospital, Washington, D.C. 20032)

21–25. **Analytical Chemistry and Applied Spectroscopy**, Pittsburgh, Pa. (R. E. Hein, Mellon Inst., 4400 Fifth Ave., Pittsburgh 15213)

21–25. Society for **Nondestructive Testing**, spring natl. conv., Los Angeles, Calif. (E. L. Criscuolo, U.S. Naval Ordnance Laboratory, White Oak, Silver Spring, Md. 20910)

21–25. **Non-Elastic Processes in the Upper Mantle**, symp., Upper Mantle Committee, Intern. Union of Geodesy and Geophysics, Newcastle, England. (D. C. Tozer, School of Physics, The University, Newcastle-upon-Tyne, 1, England)

22–26. Canadian Assoc. of **Radiologists**, 29th annual, Montreal, Quebec. (The Association, 1555 Summerhill Ave., Montreal 25)

23–25. **Biophysical** Soc., 10th annual mtg., Boston, Mass. (J. Baruch, Bolt, Beranek and Newman Inc., 50 Moulton St., Cambridge, Mass. 02138)

24–26. American Acad. of **Forensic Sciences**, Chicago, Ill. (S. R. Gerber, Law-Medicine Center, Western Reserve Univ., Cleveland, Ohio 44106)