

Andrews, Nielsen, Salomon, Findley, Eirich, Freudenthal, Higuchi, Nadai, Shand, Coleman, Corten, Mooney, Zhurkov, Yokobori, Kobayashi, Ullman, and a host of equally important builders of the basic literature are ignored (or "sacrificed") while a disproportionately generous attention is placed on the contributions of E. Andrews, Braden, Gent, Berry, Greensmith, Haward, Thomas, and Vincent, all of whom originate from the same small sector of the globe. Moreover, there is a far firmer penetration of the rubber literature than that for fibrous materials or plastics; nothing is provided on structures; and overly brief mention is paid to composite materials.

The volume's restricted length inhibits the author's desired clarity at virtually every step of his delivery. Although the book might serve several of the basic-information needs of the chemist and chemical engineer, it has neither the proper approach nor the proper subject-matter to be as useful to most members of other disciplines.

Nevertheless, this volume is the first written on the topic of fracture of polymers that takes a distinctly instructive approach. It is authoritatively written and maintains a firmly physical or quantitative bearing throughout. A good percentage of the subject matter is correlated for the first time. Despite the omnipresent confinement imposed by its brevity, the book is a fully welcome addition to the summarized literature on a very timely and critically important domain of study. The volume might find application with instructors of this subject but, as a brief and excellent stimulator of interest, it probably will be best suited for library accessibility for the oftentimes overly neglected technical browser or scientific novice. Undoubtedly it will be the forerunner of a number of future books having similar educational objectives.

The volume is expensive for its modest size and style, but is well edited, bound, and reproduced.

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**Weatherability of Plastic Materials. Applied Polymer Symposium.**  
M. R. KAMAL, Ed. Interscience, New York, 1967. viii + 306 pp.  
\$7.95.

With the increasing use of plastics as building material and for other outdoor applications, the weathering characteristics become a decisive factor in the selections of plastics. Their importance was recognized by the National Bureau of Standards and the Manufacturing Chemists' Association which sponsored a symposium on this subject in February 1967. This volume contains 19 papers presented by experts in industrial and research testing laboratories.

The simultaneous exposure to ultraviolet light, oxygen, ozone, moisture, thermal energy and air pollution causes discoloration, embrittlement, degradation, chain scission, and crosslinking. Materials under stress crack more readily than annealed ones. Since attack starts at exposed surfaces, thicker test specimens have longer outdoor life. Efforts have been made to correlate outdoor exposures at different locations with accelerated weathering tests. It is shown that one year exposure of polyolefins in Arizona corresponds to 2 years in Oklahoma or to 3½ years in Ohio. Daily and seasonal variations in the actinic portion of sunlight have been measured.

Improvements in accelerated weathering tests are reported. Xenon arc light simulates most closely the ultraviolet emission of the sun. Visual effects, like fading, blistering, chalking, cracking, delamination, flaking or darkening, and change of physical properties are discussed. Predictions of the life of formulations in outdoor environments

are compared with actual exposure results. Separate chapters are devoted to the weatherability of high-density polyethylene, polypropylene, rigid poly(vinyl chloride), acrylic laminates, and surface coatings. Under-glass exposure allows one to study portion of weathering.

This volume compiles the experiences collected at the various testing stations of this country, and it points out the problems in judging plastics for outdoor applications. It can be highly recommended to plastic designers and to all who want to employ plastics as building or protective materials. It will be of special value to polymer manufacturers and plastic fabricators who are concerned about the outdoor stability of their products.

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