

In addition, in several papers the imaging of underwater objects and the sea bed is dealt with.

This volume is highly recommended for those individuals who are either conducting research or contemplating conducting research in the acoustical imaging field.

ROBERT E. GREEN, JR.
Materials Science and Engineering
 Department
 The Johns Hopkins University
 Baltimore
 MD 21218
 U.S.A.

***Fracture Mechanics of Ceramics, Vol. 5,
 Vol. 6***

edited by R. C. Bradt, A. G. Evans, D. P. H. Hasselman and F. F. Lange; published by Plenum, New York, 1983; price, U.S. \$89.50

The understanding of the fracture behavior of ceramics has been maturing rapidly over the past decade. However, the subject is complex. Thus the studies have become numerous and their results voluminous. These two volumes, Vol. 5 and Vol. 6 of an intermittent series that was started a decade ago, attest to that situation. Together, some 140 authors from a dozen countries have contributed nearly 80 papers totaling almost 1400 pages in these volumes. This situation points to both the merits and a snag in these two books.

The merits of these volumes arise from both the quality and the breadth of the contributors. The editors are the recognized leaders in this field of ceramic analysis and science, having themselves contributed many of the major papers on the subject that are found in the journals referred to. In addition the two volumes contain summary articles by other experts in the field.

The snag in these volumes is the time delay in their publication. Although photo-ready copy was used, well over 2 years passed between the conference date (1981) and the release date, plus some more months before review copies were received. While the time lapse can be attributed to the assemblage of the large number of papers, this lag is critical in view of the pace of research in this area.

Volume 5, which carries the subtitle *Surface Flaws, Statistics, and Microcracking*, contains 39 papers. Approximately half of these report studies on specific materials, Al_2O_3 , SiC, glass, graphite etc. The remaining papers focus on a variety of phenomena and analyses that are germane to brittle fracture. Among these, "The indentation crack as a model surface flaw" by B. R. Lawn, "Microcracking mechanisms in ceramics" by D. J. Green and "Limitations and challenges in applying fracture mechanics to ceramics" by R. W. Rice and D. Lewis are recommended reading for the scientists and engineers who feel that they lag behind the front runners of the field.

Volume 6 has the subtitle *Measurements, Transformations, and High-Temperature Fracture*. Actually a variety of other papers on fracture are also included. The recommended papers for initial study by the non-expert include "A critical evaluation of fracture mechanics techniques for brittle materials" by S. W. Freiman, "Transformation toughening in ceramics" by D. B. Marshall, A. G. Evans and M. Drory and "High temperature fracture in ceramics" by A. G. Evans and W. Blumenthal.

All researchers who are involved in this field of materials development will depend heavily on the contents of the papers within these two volumes.

LAWRENCE H. VAN VLACK
Department of Materials and
Metallurgical Engineering
 The University of Michigan
 Ann Arbor
 MI 48109-2136
 U.S.A.