

Environment- Sensitive FRACTURE

Evaluation and Comparison of Test Methods

DEAN/PUGH/UGIANSKY
Editors

 **STP 821**

ENVIRONMENT-SENSITIVE FRACTURE: EVALUATION AND COMPARISON OF TEST METHODS

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B. Floyd Brown
1920–1981



Charles T. Fujii
1930–1984

Dedication

This volume is dedicated to the memory of our professional friends Floyd Brown and Chuck Fujii. Floyd was involved in the planning of this ASTM Symposium on Environment-Sensitive Fracture until his death on 16 August 1981. Chuck was a contributor to and an active participant in the symposium; he died on 26 March 1984. Both made significant contributions in the area of environment-sensitive fracture, and they worked and published together on this subject for several years at the Naval Research Laboratory (NRL). Both were active members of ASTM Committee G-1 on Corrosion of Metals and Subcommittee G01.06 on Stress Corrosion Cracking and Corrosion Fatigue. It is fitting that, as colleagues and long-time acquaintances in life, they share this memorial.

Dr. B. F. Brown was educated at the University of Kentucky, the Carnegie Institute of Technology, and Cambridge University. After an early academic career at Massachusetts Institute of Technology and North Carolina State University, Dr. Brown joined NRL in 1954 as Head of the Physical Metallurgy Branch, a position he held until his retirement from federal service in 1972. From that time until his death, he was a senior research scientist at American University in Washington, D.C.

Dr. Brown gained international recognition for his research on environment-sensitive fracture, particularly stress corrosion cracking. Of particular

relevance to this symposium, he pioneered the application of fracture mechanics to the stress corrosion problem, and the development of the threshold parameter, K_{Isc} , is due largely to his work. In association with Dr. Fujii and other colleagues at NRL, he led the way in the study of the localized chemistry and electrochemistry within stress corrosion cracks. His research was characterized by incisiveness; he was truly a master of the critical experiment.

Dr. C. T. Fujii received his academic training at the University of Hawaii and Duquesne University. He joined NRL in 1958 as a National Academy of Science-National Research Council Research Associate, and became a permanent employee in 1960. His early research at NRL was concerned with high-temperature oxidation and metal-metal vapor reactions, but for the last 15 years he worked in the area of stress corrosion cracking of high-strength alloys. At the time of his death, he was Head of the Stress Corrosion Cracking Section, Environmental Effects Branch of the Materials Science and Technology Division.

Dr. Fujii's studies of crack-tip chemistry have already been mentioned. He was also known for demonstrating the detrimental effects of impurities, particularly sulfur, on the stress corrosion resistance of high-strength steel in aqueous environments. Dr. Fujii was active in G01.06 activities on the development of stress corrosion test methods; his fine paper on the effects of sequential loading on the stress corrosion behavior of steels is published in this volume.

Floyd and Chuck will be sadly missed by those of us who had the good fortune to interact with them and share their insight of this fascinating area of materials science. The field has lost two fine scientists.

Foreword

The ASTM Symposium on Environment-Sensitive Fracture: Evaluation and Comparison of Test Methods was held in Gaithersburg, Maryland, on 26–28 April 1982. ASTM Committee G-1 on Corrosion of Metals and the National Bureau of Standards sponsored the event. The symposium chairmen were E. N. Pugh and G. M. Ugiansky, both of the National Bureau of Standards. Messrs. Pugh and Ugiansky, together with S. W. Dean, Air Products and Chemicals, Inc., have edited this publication.

Related ASTM Publications

Corrosion Fatigue: Mechanics, Metallurgy, Electrochemistry, and Engineering, STP 801 (1983), 04-801000-30

Atmospheric Corrosion of Metals, STP 767 (1982), 04-767000-27

Stress Corrosion Cracking—The Slow Strain-Rate Technique, STP 665 (1979), 04-665000-27

Intergranular Corrosion of Stainless Alloys, STP 656 (1978), 04-656000-27

Electrochemical Corrosion Testing, STP 727 (1981), 04-727000-27

Corrosion-Fatigue Technology, STP 642 (1978), 04-642000-27

A Note of Appreciation to Reviewers

The quality of the papers that appear in this publication reflects not only the obvious efforts of the authors but also the unheralded, though essential, work of the reviewers. On behalf of ASTM we acknowledge with appreciation their dedication to high professional standards and their sacrifice of time and effort.

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