

THE EFFECTS OF RADIATION ON STRUCTURAL METALS

INTRODUCTION

The Third International Symposium on the Effects of Radiation on Structural Metals was sponsored by ASTM Committee E-10 on Radioisotopes and Radiation Effects, in cooperation with ANS and ASME. It was one of the continuing series of meetings held on alternate years to present the results of research in the United States and abroad. These ASTM meetings also serve as the principal outlet for presentations of related research sponsored by the U.S. Atomic Energy Commission. Detailed papers were presented on nuclear radiation effects on pure metals and on alloys of interest for use in nuclear power reactors.

This Symposium was planned to complement the 1965 Radiation Effects Symposium, sponsored by the Nuclear Metallurgy Committee of the Metallurgical Society, AIME, held on September 8–10, at Asheville, N. C.¹ The objectives of the AIME meeting were to review empirical knowledge of radiation effects on materials and to assess the degree of agreement between theory and experiment. The objectives of the meeting reported herein were to show how selected properties of metals and alloys change as a function of reactor environment and exposure and the influence of composition and metallurgical treatment in enhancing radiation resistance. Strong emphasis was placed on reporting of changes in engineering properties of importance to mechanical design of reactor components, and on what remedial measures might be employed to negate observed detrimental effects. Thus, the two meetings together present a coordinated view of the effects of nuclear radiation on materials.

A special interim report was given on the status of hot-cell testing of the PM-2A reactor pressure vessel. Since the test series was not completed at the time of the meeting, the report was not included herein. It is strongly recommended that the final report be read when published since it will cover the first full-scale test of an irradiated reactor vessel.²

¹ Sheely, W. F., "A Summary of the Fall Meeting, Symposium on Radiation Effects," *Journal of Metals*, Vol. 18, No. 7, July 1966, pp. 891–895.

² Since the period of the Symposium, the PM-2A vessel was tested to failure. The interim report on this test is as follows:

Monahan, J. M. and Walker, T. J., "PM-2A Reactor Vessel Test—Description of Testing and Failure Conditions," WAPD-TM-640, Jan. 1967, Available from Clearinghouse for Federal Scientific and Technical Information, National Bureau of Standards, U.S. Department of Commerce, Springfield, Va., 22151.

The efforts of the authors in preparing their respective papers for presentation and publication are to be commended. Thanks are also due the many individuals that reviewed these papers and provided constructive criticism. The Symposium Committee (W. L. R. Rice, E. Landerman, and F. R. Shober) would like to make special note of the efforts of D. R. Harries, United Kingdom Atomic Energy Authority, Harwell, on behalf of the meeting. Dr. Harries participated in the symposium as an author and a Session Chairman, and also served as U. K. Coordinator for solicitation of papers. His efforts added immeasurably to the success of the meeting.

W. L. R. Rice

U.S. Atomic Energy Commission,
Washington, D.C.; symposium chairman.