

SYMPOSIUM ON RADIATION EFFECTS ON METALS  
AND NEUTRON DOSIMETRY

## INTRODUCTION

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The 1962 Symposium on Radiation Effects on Metals and Neutron Dosimetry was sponsored by ASTM Committee E-10 on Radioisotopes and Radiation Effects as part of a continuing effort to present new developments in the field of irradiation effects research. As opposed to an all-encompassing program of limited depth, the technical agenda of this Symposium was purposely restricted to irradiation studies on nonfissionable metals and supporting investigations. The four areas of research covered include fundamental or basic studies of neutron-induced changes in metals, irradiation effects in ferritic steels, irradiation effects in other structural alloys, and neutron dosimetry. Individual contributions represent the efforts and current emphasis of 18 different laboratories in the United States and Europe.

The Symposium is opened with a basic review of the evolution of radiation effects theory and the development of analytical methods for studies of atomic interactions. The next four papers describe experimental work paralleling theoretical analyses and illustrate the complexities involved in the extrapolation of radiation effects models to complex alloy systems.

The second group of papers introduces the subject of neutron dosimetry, bringing into perspective the problem of adequately defining the nuclear environment. Two reports, outlining the foil-activation approach, discuss recent neutron cross-section measurements on threshold detectors as well as new methods developed for reaction product analysis. Two other papers evaluate radiation sensing devices and analytical techniques as alternate methods for neutron flux determinations.

The third group of papers, constituting the main body of reports, is devoted to engineering studies on steels and other structural alloys. Of particular interest is the scope and direction of current irradiation effects research as outlined by these investigations. Although notch ductility and tensile determinations, relating material composition, irradiation temperature, and total neutron exposure, continue as the predominant research effort, new areas of experimental interest are being accentuated. For one, a growing emphasis on the evaluation of the effects of stress during irradiation is seen. Considerable effort is also directed toward the possibilities for inducing property recovery after neutron exposure. A third area of investigation concerns the engineering significance of neutron dose rate and spectrum varia-

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tions. Motivation for these studies is intimately connected with current questions on the validity of test reactor data for power reactor application.

In summary, it is felt that the Symposium fulfills its intended purpose of

developing a concise but complete picture of the current state of knowledge on irradiation effects on metals. The interest and efforts of the authors toward attaining this goal are highly commended.