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**SYMPOSIUM ON THE ROLE OF SUBSTRUCTURE
IN THE MECHANICAL BEHAVIOR OF METALS**

TECHNICAL DOCUMENTARY REPORT NO. ASD-TDR-63-324

April 1963 FEB 25 1964

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FOREWORD

This report contains papers presented at a symposium sponsored by the Physical Metallurgy Branch, Metals and Ceramics Laboratory, Directorate of Materials and Processes. The symposium was held at the Air Force Conference Site at Orlando AFB, Florida on 5, 6, and 7 December 1962.

With the increased demand upon the capabilities of metals, it is necessary to increase our understanding of the fundamental properties which influence their mechanical behavior. The existence of substructure in crystalline materials has been recognized for many years and has been shown to have important effects on their properties.

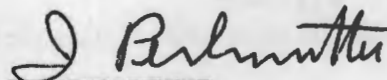
Through the development of new research tools, such as transmission electron microscopy and advanced x-ray diffraction, great progress in defining the role of substructure has been made in recent years and it was felt that the time was appropriate for a symposium. Papers were invited to cover both the state-of-the-art and current research in progress and were divided into the following four sessions: (1) Experimental Techniques for Observing and Measuring Substructure; (2) Development of Substructure by Deformation, Recovery, and Recrystallization; (3) The Role of Substructure in Yielding, Twinning, and Fracture; and (4) The Role of Substructure in Transformation and Precipitation. A fifth session consisted of a panel discussion which summarized the main contributions of the conference and highlighted the critical problems which remain to be solved.

The Physical Metallurgy Branch wishes to express appreciation for the excellent support provided by the session chairmen who not only acted in this capacity, but also planned the material to be covered and invited the papers. They were Professor S. Weissmann, Professor C. S. Barrett, Professor W. S. Owen, Dr. L. S. Darken, and Professor M. Cohen who chaired the respective sessions mentioned above.

ABSTRACT

The papers contained in this technical documentary report were presented at a symposium which dealt with the subject of substructure and its effect on the mechanical properties of metals. The symposium was held in Orlando, Florida on 5-7 December 1962. Both review papers and reports of current research are included. The following general subject areas are covered: experimental techniques for observing and measuring substructure; development of substructure by deformation, recovery, and recrystallization; the role of substructure in yielding, twinning, and fracture; and the role of substructure in transformation and precipitation.

This technical documentary report has been reviewed and is approved.



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