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Hydrogen embrittlement and stress corrosion cracking

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including the costs of some of the methods of mitigation, are also considered.

In both parts of the book each section includes numerous references, and the table of contents is organized in such a way as to serve as a subject index providing easy access to the information contained in the book.

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R. GIBALA and R. F. HEHEMANN (eds.): 'Hydrogen embrittlement and stress corrosion cracking'; 1984, Metals Park, Ohio, American Society for Metals, 324 + xxiv pp., casebound, 230 × 150 mm, $90 ($72 for ASM members), ISBN 0 87170 185 5.

This book contains the papers presented at a symposium held at Case Western Reserve University, Cleveland, Ohio, during June 1980 in honour of Professor A. R. Troiano, to mark his retirement as Republic Steel Corporation Professor of Metallurgy. Apart from the 'overview' keynote lecture by H. H. Johnson of Cornell University, Ithaca, NY, the papers included are: 'Theories of hydrogen induced cracking of steels' (J. P. Hirth); 'Hydrogen embrittlement of steels' (R. A. Oriani); 'Hydrogen trapping in iron and steels' (R. Gibala and A. J. Kumnick); 'Hydrogen trapping and hydrogen embrittlement. Some recent results on the direct observation of hydrogen trapping in metals and its consequence on embrittlement mechanisms' (P. Lacombe, M. Aucouturier, and J. Chene); 'Fracture mechanics and surface chemistry investigations of environment-assisted crack growth' (R. P. Wei, K. Klier, G. W. Simmons, and Y. T. Chou); 'The role of microstructure in hydrogen embrittlement' (I. M. Bernstein and A. W. Thompson); 'Hydrogen related second phase embrittlement of solids' (H. K. Birnbaum); 'Recent observations on the propagation of stress corrosion cracks and their relevance to proposed mechanisms of stress corrosion cracking' (D. V. Beggs, M. T. Hahn, and E. N. Pugh); 'Films and their importance in the nucleation of stress corrosion cracking in stainless steel' (Z. Szklarska-Smialowska); 'Stress corrosion cracking of ferritic and austenitic stainless steels' (A. R. Troiano and R. F. Hehemann); 'Fundamentals of corrosion fatigue behavior of metals and alloys' (D. J. Duquette); 'Hydrogen embrittlement and stress corrosion cracking of aluminum alloys' (M. O. Speidel); 'Hydrogen permeation and embrittlement studies on metallic glasses' (R. M. Latanision, C. R. Compeau, and M. Kurkela). The final paper, with the highly interesting title 'Industrial occurrence of stress corrosion cracking and means for prediction', by R. W. Staehle, is disappointingly only presented as an abstract.

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R. W. EVANS and B. WILSHIRE: 'Creep of metals and alloys'; 1985, London, The Institute of Metals, 314 + vi pp., casebound, 234 × 156 mm, £35/$56 (members discount 20%), ISBN 0 904357 59 7.

The book is published by The Institute of Metals under the banner of the series 'Predictive and quantitative metallurgy', and the authors' approach is neatly summarized by the title of the series. The authors are individuals who have considerable reputations in the field of creep of metals and alloys; while the reader may agree or disagree with the approach (particularly the θ projection concept) adopted in the book, he or she will take notice of it.

The authors present a self-contained description of the phenomenon of creep, an excellent chapter on the details of creep testing, and accounts of microstructural observations during primary and secondary creep and phenomenological description, as well as dislocation models for creep mechanisms. The authors try to present persuasive arguments that a 'steady state' condition is not attained, even at elevated temperatures. They re-emphasize their belief that most materials exhibit a 'minimum' creep rate, rather than a 'steady state' period. The authors proceed to present the θ projection concept, which makes it possible for the dependence of the shape of normal creep curves to be accurately described in terms of parameters that can be interpreted in relation to the mechanisms determining primary and tertiary creep. The concept offers a good basis for interpolation and extrapolation of both creep strain and stress rupture properties. The θ projection concept, if substantiated by further satisfactory correlation with high precision, constant stress creep results, has the potential to offer a foundation for the development of a unified approach to creep. This will have immediate implications in solving practical problems in engineering design. It is a good book to read for new research workers who are contemplating working in the area of creep, and also for investigators who are established in this field. They will enjoy reading the sometimes controversial, thoroughly persuasive, often entertaining, and definitely iconoclastic views of the authors.

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