



## Contents

The page numbers refer to those given on the bottom of the pages.

Introduction . . . . .	XI
Acknowledgements . . . . .	XII
Dedication to Carl Wagner . . . . .	XIII
<i>H. Asano, M. Hirabayashi</i>	
Hydrogen Ordering in Va Transition Metal Hydrides . . . . .	1
<i>T. Schober, W. Pesch</i>	
The Systems Vanadium—Hydrogen and Vanadium—Deuterium . .	21
<i>B. J. Makenas, H. K. Birnbaum</i>	
Non-stoichiometric Hydride Phases in the Nb—H System . . . . .	29
<i>H. Zabel, H. Peisl</i>	
Sample Shape Dependent Phase Transition of H in Nb . . . . .	30
<i>G. Mair, K. Bickmann, H. Wenzl</i>	
Structural Transformation Correlated with Order-Disorder Transformations of H in NbH Crystals . . . . .	31
<i>M. A. Pick, D. O. Welch</i>	
Hydrogen Absorption in the Niobium—Vanadium System . . . . .	39
<i>H. Müller, P. Knappe, O. Greis</i>	
Lattice Parameters of Hydrides and Deuterides of La, Pr, and Nd .	47
<i>H. Uchida, Y. C. Huang, M. Tada, K. Fujita</i>	
The Phase Equilibria of La—H and Sm—H Systems . . . . .	53
<i>D. G. de Groot, R. G. Barnes, B. J. Beaudry, D. R. Torgeson</i>	
Nuclear Magnetic Resonance Evidence for the Occurrence of an Ordered Structure in the La—H System Near $\text{LaH}_{2.65}$ at 250 K . .	61
<i>B. Baranowski</i>	
Metal—Hydrogen Systems in the High Pressure Range . . . . .	71
<i>W. Klostermeier, A. W. Szafranski, E. U. Franck</i>	
Liquid Mixtures of Sodium and Sodium Hydride and of Cesium and Cesium Hydride at High Pressures and Temperatures. . . . .	95
<i>C. Picard, O. J. Kleppa, G. Boureau</i>	
High Temperature Thermodynamics of Solutions of Hydrogen in Palladium and in Palladium—Silver Alloys . . . . .	97

Contents

<i>C. B. Satterthwaite, T. E. Ellis, M. H. Mueller, T. O. Brun</i>	
Order-disorder in PdH(D) <sub>x</sub>	98
<i>R. Abbenseth, H. Wipf</i>	
Thermal Expansion of Hydrogen- and Deuterium-Doped Palladium	99
<i>D. H. Everett, P. A. Sermon</i>	
Crystallite Size Effects in the Palladium/Hydrogen System: A Simultaneous Sorption and X-ray Study	101
<i>I. S. Anderson, C. J. Carlile, D. K. Ross, D. L. T. Wilson</i>	
Interstitial Interactions in the Palladium—Hydrogen (Deuterium) System	115
<i>F. A. Lewis, W. D. McFall, T. C. Witherspoon</i>	
Hysteresis of Pressure — Composition and Electrical Resistance — Composition Relationships of Palladium/Hydrogen and Palladium Alloy/Hydrogen Systems	127
<i>D. J. Gillespie, A. C. Ehrlich</i>	
Electrical Resistivity Studies of (Pd <sub>95</sub> Rh <sub>5</sub> ) <sub>1-x</sub> H <sub>x</sub>	139
<i>F. M. Mazzolai, F. A. Lewis, M. Nuovo, R. Franco</i>	
Features of Palladium/Hydrogen and Palladium Alloy/Hydrogen Systems as Deduced by Anelastic Measurements	149
<i>H. Brodowsky, D. Repenning</i>	
Equilibrium H/D Separation Factors in Pd and in Nb	159
<i>A. M. Hoefsloot, B. M. Geerken, R. Griessen</i>	
Elastic Constants of Palladium—Hydrogen Alloys between 4.2 and 300 K	173
<i>A. J. Maeland</i>	
Diffusion of Hydrogen in the Metallic Glass Pd <sub>0.80</sub> Si <sub>0.20</sub>	174
<i>J. Völkl, G. Alefeld</i>	
Anelasticity Due to Long-Range Diffusion	175
<i>D. Emin, M. I. Baskes, W. D. Wilson</i>	
The Diffusion of Hydrogen and its Isotopes in BCC Metals	193
<i>H. Teichler</i>	
On the Isotope Dependence of Hydrogen Diffusion in Metals	201
<i>J. Hauck</i>	
Isotope Effects for Hydrogen Diffusion in Transition Metals	211
<i>Y. Hayashi, N. Iwai, N. Ohtani</i>	
Change of Hydrogen Diffusivity with Order-Disorder Transformation in Ni <sub>3</sub> Fe, Ni <sub>3</sub> Pt, and Ni <sub>3</sub> Mn	221

Contents

<i>W. Maier, H. Wipf</i>	
The Electrotransport of H and D in V, Nb and Ta at High Hydrogen Concentrations . . . . .	229
<i>J.-F. Marêché, J.-C. Rat, A. Herold</i>	
Electromigration of Hydrogen and Deuterium in Titanium . . . . .	237
<i>S. Dais, R. Messer</i>	
Investigation of Proton Diffusion in Niobium by Nuclear Magnetic Resonance . . . . .	241
<i>Y. Fukai, K. Kubo, S. Kazama</i>	
Diffusion of H in $\alpha$ -NbH <sub>x</sub> D <sub>y</sub> . . . . .	245
<i>L. D. Bustard, R. M. Cotts, E. F. W. Seymour</i>	
A Study of Hydrogen Diffusion in Titanium Hydride using Nuclear Magnetic Resonance Techniques. . . . .	251
<i>J. Shinar, D. Davidov, D. Shaltiel, N. Kaplan</i>	
NMR Investigation of ZrMn <sub>2</sub> H <sub>x</sub> and HfV <sub>2</sub> H <sub>2.1</sub> Hydrides . . . . .	261
<i>R. Dörr, E. Brauer, R. Gruner, F. Rauch</i>	
Hydrogen Detection in Metals by Means of a New Nuclear Physical Method . . . . .	271
<i>J. Čermák, A. Kufudakis, V. Redl</i>	
Diffusion of Hydrogen in Imperfect Lattices of Nickel . . . . .	279
<i>M. I. Baskes, C. F. Melius</i>	
Theoretical Study of the Trapping and Mobility of Hydrogen Near Vacancies, Dislocations, and Cracks in Nickel . . . . .	289
<i>B. Hohler, H. Kronmüller</i>	
Investigation of Hydrogen-Impurity-Complexes in Transition Metals	301
<i>T. Springer</i>	
Investigation of Metal-Hydrogen Systems by Means of Neutron Scattering . . . . .	317
<i>D. K. Ross, P. F. Martin, W. A. Oates, R. K. Bakhsh</i>	
Inelastic Neutron Scattering Measurements of Optical Vibration Frequency Distributions in Hydrogen-Metal Systems . . . . .	341
<i>H. R. Schober, V. Lottner</i>	
Lattice Dynamical Aspects of H in V, Nb, Ta and Pd . . . . .	351
<i>W. Schäfer, E. Lebsanft, A. Bläsius</i>	
Investigation of TiFe Deuteride Structures by Means of Neutron Powder Diffraction and the Mössbauer Effect . . . . .	361
<i>A. Bläsius, R. S. Preston, U. Gonser</i>	
Mössbauer Study of the Diffusion of Stored Hydrogen in <sup>57</sup> Fe-Doped Titanium . . . . .	373

Contents

<i>F. Pröbst, F. E. Wagner, M. Karger, G. Wortmann</i>	
Mössbauer Study of the Local Environment of Substitutional Co and Fe Impurities in Hydrogen-Doped Palladium . . . . .	387
<i>W. E. Wallace</i>	
Magnetism of Hydrogenated Intermetallic Compounds Containing <i>d</i> -transition Metals . . . . .	395
<i>K. Yagisawa, A. Yoshikawa</i>	
Effect of Hydrogen Absorption on the Magnetic Properties of the Intermetallic Compound CaNi <sub>5</sub> . . . . .	415
<i>H. J. Schenk, H. J. Bauer</i>	
Kinetics of Hydrogenation of Ni–Mn Alloys and Influence of Interstitial Hydrogen on their Magnetic Behaviour . . . . .	425
<i>G. Herbst, H. Kronmüller</i>	
Magnetic Orientation Aftereffect of Hydrogen Isotopes in Rare Earth–Cobalt Alloys . . . . .	431
<i>D. B. Poker, G. G. Setser, A. V. Granato, H. K. Birnbaum</i>	
Low Temperature Anelastic Behavior of Niobium Containing Hydrogen . . . . .	439
<i>A. C. Switendick</i>	
Band Structure Calculations for Metal Hydrogen Systems. . . . .	447
<i>C. A. Sholl, P. V. Smith</i>	
The Energy and Electron Density of States of Hydrogen Impurities in Metals . . . . .	471
<i>N. I. Kulikov, A. D. Zvonkov</i>	
Band Structure and Metal-to-Semiconductor Transition in the Cubic Hydrides of 3B-Subgroup Elements . . . . .	479
<i>D. J. Peterman, B. N. Harmon, D. L. Johnson, J. Marchiando</i>	
Electronic Structure of Trivalent Metal Dihydrides: Theory . . . . .	491
<i>J. H. Weaver, D. T. Peterson</i>	
Photoelectron Spectroscopy of Metal Dihydrides. . . . .	501
<i>G. Sicking</i>	
Effects of V Admixtures on the Mobility and Solubility of Hydrogen in Palladium Investigated with SX-APS . . . . .	507
<i>P. A. Hornung, A. D. Khan, D. R. Torgeson, R. G. Barnes</i>	
Hydrogen Diffusion and Electronic Structure Parameters in Tantalum Hydrides Determined by Pulsed NMR Measurements . . . . .	521
<i>H. Metzger, H. Jo, S. C. Moss</i>	
Distortion Induced Superstructure Modulation in Ordered Metal Hydrogen Systems . . . . .	531

## Contents

<i>V. A. Somenkov, S. Sh. Shil'stein</i>	
Structural Behaviour of Hydrogen in Metals and Intermetallic Compounds . . . . .	539
<i>H. D. Carstanjen</i>	
Investigation of Interstitial Positions and Vibrational Amplitudes of Hydrogen in Metals by Fast Ion Channeling . . . . .	559
<i>H. E. Flotow</i>	
Electronic Specific Heats in Metal-Hydrogen Systems . . . . .	561
<i>Z. Biegański, B. Staliński</i>	
Low Temperature Specific Heats of Light Rare Earth Trihydrides .	575
<i>C. Arzoumanian, J. P. Burger, L. Dumoulin, P. Nedellec</i>	
Electron-Phonon Coupling in $\text{PdH}_x$ and $\text{PdD}_x$ Films . . . . .	583
<i>W. J. Venema, R. Feenstra, F. Blom, R. Griessen</i>	
Absolute Amplitude, Dingle Temperature and Frequency of de Haas-van Alphen Oscillations in Pd-H Alloys . . . . .	591
<i>W. Buckel</i>	
Superconductivity and Electron-Phonon Interaction . . . . .	601
<i>J. C. M. van Dongen, J. A. Mydosh</i>	
Depression of the Superconducting Transition Temperature of Palladium Hydride with Magnetic Impurities: Fe and Cr . . . . .	615
<i>D. A. Papaconstantopoulos, E. N. Economou, B. M. Klein, L. L. Boyer</i>	
Electronic Structure and Superconductivity in Pd-Ag-H and Pd-Rh-H Alloys . . . . .	623
<i>K. W. Kehr, G. Honig, D. Richter</i>	
Stochastic Theory of Spin Depolarization of Muons Diffusing in the Presence of Traps . . . . .	624
<i>M. Camani, F. N. Gygax, W. Rüegg, A. Schenck, H. Schilling, J. Keller</i>	
The Positive Muon as a Light Isotope of Hydrogen: Trapping in Copper, Vanadium, Niobium and Tantalum . . . . .	625
<i>H. Orth, K.-P. Döring, M. Gladisch, D. Herlach, W. Maysenhölder, H. Metz, G. zu Putlitz, A. Seeger, J. Vetter, W. Wahl, M. Wigand, E. Yagi</i>	
Localization and Diffusion of Positive Muons in Metals . . . . .	631
<i>O. Hartmann, E. Karlsson, L.-O. Norlin, K. Pernestål, M. Borghini, T. O. Niinikoski, J. C. Soulé, K. W. Kehr, D. Richter, E. Walker, K. Schultze, A. Yaouanc, J. F. Dufresne, R. Longobardi, J. P. Pezzetti, J. Chappert</i>	
Diffusion of Positive Muons in Nb and Fe in Presence of Impurities	645
<i>J. J. Reilly</i>	
Metal Hydride Technology . . . . .	655

## Contents

<i>K. Nakamura</i>	
Effect of Metallic Films on the Hydrogen Absorption Rate of Nb and Ta . . . . .	685
<i>D. T. Hughes, I. R. Harris</i>	
Hydrogen Diffusion Membranes based on some Palladium – Rare Earth Solid Solution Alloys . . . . .	697
<i>E. Lebsanft, D. Richter, J. M. Töpler</i>	
Study of the Diffusion of Hydrogen in Potential Hydrogen Storage Materials . . . . .	707
<i>H.-J. Rätzer-Scheibe, H. Buhl</i>	
The Relationship between Hydrogen Absorption and Stress Corrosion Cracking for Titanium Alloys . . . . .	717
<i>G. J. Thomas, M. I. Baskes, R. E. Stoltz</i>	
Deuterium Transport and Trapping in Stainless Steels . . . . .	727
<i>L. Schlapbach, A. Seiler, F. Stucki, P. Zürcher, P. Fischer, J. Schefer</i>	
How FeTi Absorbs Hydrogen . . . . .	729
<i>M. Peretz, D. Zamir, D. Shaltiel, J. Shinar</i>	
The Relation between the Electronic Structure and Hydrogen Storing Properties of Intermetallic Compounds . . . . .	745
<i>J. F. Lynch, J. R. Johnson, J. J. Reilly</i>	
The Dilute Solution of Hydrogen and Deuterium in (C-15) TiCr <sub>1.8</sub>	753
<i>R. Burch, N. B. Mason</i>	
Thermodynamic Relationships and Structural Transformations in TiCo and TiNi Intermetallic Alloy – Hydrogen Systems . . . . .	769
<i>B. S. Bowerman, C. A. Wulff, T. B. Flanagan</i>	
Calorimetric Enthalpies for Solution of Hydrogen in the LaNi <sub>5</sub> – H System . . . . .	781
<i>G. X. Tessema, J. Peyrard, A. Nemoz, J. P. Senateur, A. Rouault, R. Fruchart</i>	
CeRu <sub>2</sub> : Valence Change of Ce Ions Induced by Hydrogen Absorption	793
<i>J. Genossar, P. S. Rudman</i>	
The Catalytic Role of Mg <sub>2</sub> Cu in the Hydriding and Dehydriding of Mg . . . . .	799
<i>F. H. M. Spit, J. W. Drijver, S. Radelaar</i>	
Hydrogen Sorption in Amorphous Ni(Zr,Ti)-Alloys . . . . .	809
<i>M. I. Darby, M. N. Read, K. N. R. Taylor</i>	
Factors Affecting the Absorption of Hydrogen by Zircaloys . . . . .	817
<i>A. P. Zakharov, A. E. Gorodetsky, V. M. Sharapov</i>	
Diffusion of Hydrogen in Mo Enhanced by Self-interstitial Atoms .	825
Author Index . . . . .	837