

Table of Contents

Preface

Chapter 1: Introduction

Remarks on Scientific Poetry

G. Brauer 3

Positron Annihilation Spectroscopy: A Prelude to Modern Aspects

B.N. Ganguly 7

Chapter 2: Positron Beams and Advanced Techniques

Design and Construction of a Slow Positron Beam for Solid and Surface Investigations

W. Anwand, G. Brauer, M. Butterling, H.R. Kissener and A. Wagner 25

Annihilation Lifetime Spectroscopy Using Positrons from Bremsstrahlung Production

A. Wagner, W. Anwand, M. Butterling, T.E. Cowan, F. Fiedler, M. Kempe and R. Krause-Rehberg 41

Low Background Digital Coincidence Spectrometer – A Tool for Investigation of Positron Annihilation in Flight

J. Čížek, M. Vlček, F. Lukáč, O. Melikhova, I. Procházka, W. Anwand, M. Butterling, A. Wagner and G. Brauer 53

Production and Applications of Intense Pulsed, Slow Positron Beams

B.E. O'Rourke, N. Oshima, A. Kinomura, T. Ohdaira and R. Suzuki 75

Chapter 3: Applications: Materials, Chemistry and Life Science

Investigations of HAVAR® Alloy Using Positrons

S.M.T. Beck, W. Anwand, A. Wagner, G. Brauer, A. Beck, A. Ocherashvili, O. Hen, S. Haroush, Y. Eisen and D. Moreno 95

Characterization of H-Plasma Treated ZnO Crystals by Positron Annihilation and Atomic Force Microscopy

J. Čížek, I. Procházka, J. Kuriplach, W. Anwand, G. Brauer, T.E. Cowan, D. Grambole, H. Schmidt and W. Skorupa 113

Depth Resolved Positron Annihilation Studies of Si and Metal Silicides

G. Amarendra and S. Abhaya 127

Structural Studies of Nanocrystalline Thin Pd Films Electrochemically Doped with Hydrogen

J. Čížek, M. Vlček, F. Lukáč, M. Vlach, I. Procházka, G. Brauer, W. Anwand, A. Mücklich, S. Wagner, H. Uchida and A. Pundt 137

Investigation of Dual-Beam-Implanted Oxide-Dispersed-Strengthened FeCrAl Alloy by Positron Annihilation Spectroscopy

R. Kögler, W. Anwand, A. Richter, M. Butterling, A. Mücklich, X. Ou, H. Reuther, C.L. Chen and A. Wagner 149

Application of Positron Annihilation Spectroscopy to the Study of Irradiated Fe-Cr Alloys

M. Butterling, F. Bergner, C. Heintze, W. Anwand and A. Ulbricht 165

Defect Behaviour in Yttria-Stabilised Zirconia Nanomaterials Studied by Positron Annihilation Techniques

I. Procházka, J. Čížek, O. Melikhova, J. Kuriplach, W. Anwand, G. Brauer, T.E. Konstantinova, I.A. Danilenko and I.A. Yashchishyn 181

Variable Energy Positron Annihilation Spectroscopy of Perovskite Oxides

D.J. Keeble 201

Application of Positron Beams to the Investigation of Memristive Materials and Diluted Magnetic Semiconductors

K. Potzger and M.O. Liedke 235

Positron Chemistry in Polymers

Y. Kobayashi

253

Applications of Positron Annihilation Spectroscopy to Life Science

H.M. Chen, J.D. van Horn and Y.C. Jean

275