

TABLE OF CONTENTS

Preface	iii
A Basic Corrosion Scientist: Norio Sato	ix
K. Hashimoto and T. Ohtsuka	
Norio Sato -- A Professor From Hokkaido	xiii
R. W. Staehle	

Composition and Structure of Passive Films

In-Situ Studies of Passive Oxide Films on Iron-Chromium Alloys in Solution and in Low Pressure Oxygen	1
D. Landolt	
Influence of the Alloying Elements on the Electronic Structure of Passive Films Formed on Stainless Steel and Alloy 600	15
S. Faty, N. Hakiki, G. Goodlet, M. G. S. Ferreira, and M. da Cunha Belo	
In Situ XANES Investigations on the Passivity of Fe in Phosphate Solutions	25
P. Schmuki, S. Virtanen, M. Büchler, and H. S. Isaacs	
Oxidation of Iron in 288 °C Water	35
C. S. Kumai and T. M. Devine	
Structure of Passivation Films Formed on Sintered Ti-Mo Alloys	47
K. Nakahara, S. Sakaguchi, and Y. Hayashi	
Corrosion of 316 Stainless Steel in Supercritical Water	57
H. Kim, Y. Kurata, and N. Sanada	
Role of Surface Composition on the Corrosion Resistance of Electropolished 316L Stainless Steel	66
B. DeForce, S. Collins, and P. Williams	
Growth and Oxidation of Thin Film Al ₂ Cu	75
K. -A. Son, N. Missert, J. C. Barbour, J. J. Hren, R. G. Copeland, and K. G. Minor	

Chemistry and Properties of Passive Films

Electrochemical Study of Passive Films Formed on Iron in the Presence of EDTA	84
E. Sikora and D. D. Macdonald	
Transient Ionic Space Charges in Passive Films. Experiment and Simulation	94
M. M. Lohrengel, A. Moehring, and M. Pilaski	

Transpassive Dissolution of Iron in Acidic Solution Investigated by Channel Flow Electrode	103
M. Itagaki, N. Hasebe, and K. Watanabe	
Classification of Rust Stability on Weathering Steel Structures	112
H. Kihira, A. Usami, S. Ito, and T. Murata	
Long-Term Exposure Rust Transformation and Ion Selectivity of Cr-Substituted Goethite Consisting Final Protective Rust-Layer on a Weathering Steel	122
T. Misawa and H. Miyuki	
Study of the Corrosion Resistance of Sintered Stainless Steel	132
P. L. Bonora, F. Deflorian, L. Fedrizzi, and A. Molinari	
Ion Selective Permeability of the Rust on Low Alloy Steel	141
K. Noda, T. Nishimura, H. Masuda, and T. Kodama	
Electrochemical Properties of Oxide Film on MP35N Alloy	151
N. Istephanous, J. Gilbert, G. Martinez, J. Wiser, U. Ko, T. Irwin, and D. Untereker	
Electronic Properties and Pitting Susceptibility of Passive Films on Ferrite and Pearlite in Chloride-Containing Solution	161
W. S. Li and J. L. Luo	
Effect of Benzotriazole on Anodizing of 2024 Aluminium Alloy in Sulfuric Acid at Low Temperature	171
M. Sakairi, P. Skeldon, G. E. Thompson, G. C. Wood, and K. Stevens	
Barrier Aluminium Oxide Films in Aluminium Electrolytic Capacitors	181
H. Uchi, T. Kanno, and R. S. Alwitt	
The Alternative Electrochemistry of Gold	190
L. D. Burke, L. M. Hurley, and A. P. O'Mullane	
Potential Modulation Reflectance of Passivated Iron and Nickel	200
T. Ohtsuka	
The Nature of the Passive Film on Tungsten	205
J. Sikora, E. Sikora, and D. D. Macdonald	
Stability of the Anodic Oxide Film Formed on Titanium in Daeerated Neutral Solutions	215
K. Azumi, N. Yasui, and M. Seo	
Tarnishing of Nickel in Humid Air at Temperatures from 40 to 80 °C	225
H. Kato and S. Furuya	
Effects of C and Cr Contents on Corrosion Resistance of WC-Ni-Cr Cemented Carbides	232
S. Imasato, S. Sakaguchi, K. Sugano, and Y. Hayashi	

Chemistry and Properties of Passive Films and Conversion Films

Speciation of Oxo-Chromium(VI) Anions and the Corrosion Inhibition of Aluminium Alloys	239
M. Kendig, R. McCreery, J. Ramsey, and L. Xia	
On the Bipolar Mechanism for Chromate-Induced Repassivation of Active Sites on Chromate Conversion Coated Aluminium Alloys	249
C. R. Clayton, G. P. Halada, D. Chidambaram, and M. J. Vasquez	
Corrosion Protection of Aluminium Alloys and Mild Steel Provided by Rare Earth Metal Salts (REMS) Solutions	259
F. Mansfeld	
Mass Transport Limited Oxygen Reduction Kinetics on Chromate Conversion Coated Al-Cu, Al-Cu-Mg and Al-Cu-Mn-Fe Intermetallic Compounds	269
G. O. Ilevbare, C. S. Jeffcoate, and J. R. Scully	
An EQCM Analysis of Passivation Process of Copper Thin Film	280
M. Seo and H. Tsuda	
Hydrophobicity and Structural Stability During Aging of Chromate Conversion Coatings on Al Alloys	290
C. R. Clayton, G. P. Halada, M. J. Vasquez, J. R. Kearns, D. Chidambaram, and R. D. Granata	
Release of Chromate Ions from Chromate Conversion Coatings on Al Alloys	300
E. Akiyama, L. Xia, R. McCreery, A. Markworth, and G. S. Frankel	
Dissolution of Oxide Films on Aluminum in Near Neutral Solutions	310
H. S. Isaacs, F. Xu, and C. S. Jeffcoate	

Photoelectrochemistry of Passive Films

Photoelectrochemical Characterization of Corrosion Layers on Yttrium in Alkaline Solutions	317
S. Piazza, S. Caramia, C. Sunseri, and F. Di Quarto	
UV Light Induced Change of Anodic Oxide Films on Titanium in Acidic Sulfate Solution	330
T. Ohtsuka and T. Otsuki	
Localised Photoelectrochemical Measurement with the Scanning Droplet Cell	337
A. W. Hassel and M. Seo	
The Influence of Heat on the Measurement of Photocurrent at the Anodic Film of Nickel Electrode	347
H. Chen and Z. Jiang	
Ultra-Violet Light Irradiation to Sensitized Stainless Steel for Inhibiting Stress Corrosion Cracking	353
T. Haruna, K. Onishi, and T. Shibata	
XPS and Photoelectrochemical Study on Passivity of Pure Chromium in Acid Solution	360
S. Fujimoto, O. Chihara, K. Somiya, and T. Shibata	

Breakdown and Repassivation

Sequence of Events in the Breakdown of Passivity on Stainless Steels	367
D. D. Macdonald and D. F. Heaney	
Reformation of Anodic Oxide Films on Aluminium after Destruction with Laser Irradiation in Solutions - Effects of Anion and pH -	377
H. Takahashi, M. Sakairi, and Y. Ohira	
Current-Limited Imposed-Potential Technique for Inducing and Monitoring Metastable Pitting Events	387
F. D. Wall	
Effects of Hydrogen and Stress on the Corrosion Behaviour of 304 Stainless Steel in Chloride-Containing Solution	397
Q. Yang and J. L. Luo	

Pitting Corrosion

Influence of Mo and N on Initiation and Repassivation of Pits on Stainless Steels	404
F. Falkenberg and I. Olefjord	
Interactions among Localized Corrosion Sites Investigated with Electrode Arrays	414
T. T. Lunt, V. Brusamarello, J. R. Scully, and J. L. Hudson	
Experimental and Theoretical Studies of Pit Initiation at Single MnS Inclusions in Stainless Steels	425
E. G. Webb, T. Suter, F. Topin, and R. C. Alkire	
Ex-Situ Investigation of Chloride Interaction with Oxides on Polycrystalline Aluminium Prior to Pitting	435
S. Y. Yu, P. M. Natishan, D. E. Ramaker, and W. E. O'Grady	
Initiation Events of Pitting Corrosion of Titanium	445
C. Curty and S. Virtanen	
Morphology of Pits in Nickel: Anisotropic Growth Due to Crystallographic Orientation	453
J. A. Lillard, J. F. Bingert, and D. G. Kolman	
Pitting Behavior of a Novel SiC/Al ₂ O ₃ /Al Composite Exposed to Chloride Environments	463
D. G. Kolman and D. P. Butt	
Localized Corrosion Behavior of Nickel and Cobalt Based Alloys in Chloride and Bromide Solutions	473
R. B. Rebak, N. E. Koon, J. P. Cotner, and P. Crook	
Initiation and Stability of Localized Corrosion Processes on Stainless Steels	483
H. Böhni, S. Matsch, T. Suter, and J. O. Park	
Corrosion Electrochemistry of Aluminium and Titanium Alloys in Halide Environments	493
L. Chen, E. -H. Chung, J. J. Williamson, and K. Nobe	

Corrosion Behaviour of Zirconium-Based Amorphous Alloys in Artificial Body Fluid	505
S. Hiromoto, A. -P. Tsai, M. Sumita, and T. Hanawa	
The Influence of W and Mo Addition on the Passivity of Stainless Steels	513
H. Y. Jang and Y. S. Kim	
Role of Manganese in the Corrosion of Welded 316L	523
B. DeForce, S. Collins, and P. Williams	
Microelectrochemical Studies on the Influence of N and Mo on Initiation Events of Pitting Corrosion	533
Y. Kobayashi, S. Virtanen, and H. Böhni	
The Shape of Pits in Stainless Steel	541
N. J. Laycock, S. P. White, and W. Kissling	
An Electron-Donor, Band-Bending Mechanism for Understanding the Effects of Anodic Dissolution and Dilute Metal Alloying on the Pitting Corrosion of Aluminium in Chloride Media	551
D. E. Ramaker and T. M. Nabi	
Metal Dissolution Kinetics in Aluminium Etch Tunnels	561
Y. Tak, N. Sinha, and K. R. Hebert	
Influence of Stirring on Tunnel Growth in Aluminium Etching	571
D. G. W. Goad and H. Uchi	

Crevice Corrosion, SCC and Related Processes

The Electrochemistry and Corrosion of Beryllium in Buffered and Unbuffered Chloride Solutions	580
A. Venugopal, D. D. Macdonald, and R. Varma	
Holistic-Probabilistic Studies on Localized and General Corrosion	589
G. Salvago, L. Magagnin, and M. Bestetti	
Characterization of the Scaling Factor in Crevice Corrosion for Systems with Active/Passive Transitions	599
B. G. Ateya, M. Abdulsalam, and H. W. Pickering	
Modeling Disbonded Coatings Using the Quasipotential Transformation	609
K. N. Allahar and M. E. Orazem	
A Proposal of Stress Corrosion Cracking Mechanism for Explaining Elongation Behavior of Solution Annealed Austenitic Stainless Steels, Type 304 and Type 316	624
R. Nishimura and K. Yamakawa	
Dissolution and Passivation of Fresh Surface at Crack Tip on Corrosion Fatigue Process	634
Y. Oyama, A. Nishikata, and T. Tsuru	
Comparison of the Crevice Corrosion Resistance of Alloys 625 and C22	644
B. A. Kehler, G. O. Ilevbare, and J. R. Scully	

Atomic Processes at Metal Surfaces

- The Low-Dimensional Phase Concept Applied to the Dissolution and
Passivation of Transition Metals 655
W. J. Lorenz, W. Wiesbeck, and G. Staikov

- Atomic Force Microscopy Study of Pit Formation During
Anodic Etching of Aluminium 671
T. Martin and K. R. Hebert

Corrosion Monitoring

- Theoretical Analysis on Real-Time Monitoring of Corrosion Condition 681
K. Katoh and S. Asakura

- Applicability of Y_p - I_s Analysis to Real-Time Monitoring of Corrosion Condition 691
K. Katoh

- Corrosion Monitoring of Carbon Steel in the Concentrated LiBr Solution 701
H. Kameda, Y. Atarashiya, and S. Komukai

- Laboratory Evaluation Method for Microbially Influenced Corrosion Resistance of
Stainless Steels in Aerobic Aqueous Environment 710
H. Amaya and H. Miyuki

- Authors Index** 720

- Subject Index** 725