

Table of Contents

Preface

Chapter 1: Treatment of Structural Metals

Surface Alloying of Tool Steels with Ytterbium Pulse Fiber Laser

A. Lupsanov, S. Lysykh, S. Bronnikova, D. Dasheev, U. Mishigdorzhyn, A.V. Nomoev, N. Ulakhanov and I. Yuzhakov

3

Structure Hardness and Elastic Modulus of Ti-Nb-Y Alloys

B. Bolormaa and M. Dovchinvanchig

13

Modelling and Optimization of Amphoteric Surfactant Concentration in Electroless Nickel Boron Coatings for Maximum Microhardness

M. Vijayanand, R. Varahamoorthi, P. Kumaradhas and S. Sivamani

19

Chapter 2: Friction Welding

Friction Stir Welding Process Optimization on 4 Tool pin Geometries with Process Parameters and Shoulder Concave Angle in 6005A-T6 Aluminium Alloy Joining

N.A. Pontjonoto, I.M.L. Batan, A.S. Pramono, A. Wahjudi and Mulyadi

33

Macrostructure and Shear Strength Analysis on Cu-Al Joint of Micro Friction Stir Spot Welding

H. Muzakki, I. Millaily, Ahmadi, Suwarsono and J.S. Bale

41

Influence of Tool Rotation and Surface Roughness on the Shear Strength of Nylon 6 - SS 304 Dissimilar Joint Resulted by Friction Lap Welding

W. Wahono, I. Arnanda, A. Suyetno, A. Aminnudin, A.S. Ansari and Y.R.A. Pradana

47

The Influence of the Tool Concave Shoulder Angle on Heat Generation in the Stir Friction Welding Process with AA6061-T651 Materials

Mulyadi, A.S. Pramono, A. Wahjudi, I.M.L. Batan and N.A. Pontjonoto

55

Chapter 3: Corrosion Behaviour and Hydrogen Embrittlement of Materials

Features of Crevice Corrosion of Different Grades of Duplex Stainless Steels

A.S. Fedorov, V. Karasev and P. Kovalev

65

Analysis of Causes of Corrosion Damage to Internal Surface of Stainless Steel Heat Exchanger Tubes

J.S. Karzina and O.V. Shvetsov

71

Criteria for Revaluating the Propensity of Metals to Corrosion Cracking during Accelerated Testing in an Environment with Hydrogen Sulfide and Carbon Dioxide

O.V. Shvetsov, S. Kondratev, A. Kharkov, A.A. Alkhimenko and A.D. Davydov

79

Technological Support for Evaluation of Hydrogen Compatibility of Materials in Laboratory Conditions

A.S. Tsvetkov, N.O. Shaposhnikov, V.A. Yakhimovich, M.K. Kurakin and A.A. Lapechenkov

85

Physical Modeling of Steel Resistance to Hydrogen Embrittlement

N.O. Shaposhnikov, A.S. Tsvetkov, D.A. Strekalovskaya, A. Nikolaeva and N.A. Devyaterikova

91

Analysis of the effect of Zea Mays husk particulate reinforcement on 1170 Aluminium corrosion in a simulated industrial environment

W.A. Joseph, R.T. Loto, P. Babalola and J. Okeniyi

97

Chapter 4: Corrosion Protection

Mild Steel Corrosion Inhibition by <i>Andrographis paniculata</i> Leaves Extract in 10 % Hydrochloric Acid Solution N.M.I. Alhaji and S. Sujatha	111
Study of Green Corrosion Inhibitor of <i>Aegle marmelos</i> Leaves Extract in Acidic Medium V.V. Sravanth, S.L. Avapati, V.R. Poiba and M. Vangalapati	117
Comparative Evaluation of the Protection Performance of Admixed Tea Tree and Grapefruit Essential Oil Extracts on Mild Steel and Alloy Steel 3310 O. Osamudiam, A.C. Nissi, O.O. Oluwakayode, U.V. Oghoho, O.C. Daniel, I.P. Smart, P.A.C. Lemuel, O.R. Nwabeze and R.T. Loto	127
Evaluation of Protective Properties of Lacquer Coatings on Copper Products Operating in a Low Aggressive Corrosive Environment A.D. Davydov, M. Kovalev and D. Lyashenko	135

Chapter 5: Glasses and Functional Ceramics

CoAl₂O₄ Spinel Growth on SiO₂ Substrates via Annealing of Magnetron Sputtered Thin Films I.A. Ereemeev, D.V. Honcharenko and A.V. Semench	145
Reproducibility of Properties of As_xSe_{1-x} Glasses on the Synthesis Temperature M.E. Samigullin, A.V. Belykh, N.I. Krylov, M.D. Mikhailov and A.V. Semench	151
Influence of the Type and Concentration of the Dopant on the Photocatalytic Activity of Strontium Bismuthate Sr₂Bi₂O₅ D.S. Shtarev, E.A. Kirichenko, A.V. Shtareva, A.J. Petrova, V.O. Krutikova and I.A. Astapov	157
The Synthesis Regimes Effect on Powders and Ceramics of MgAl₂O₄ Doped with Cr³⁺ E. Afanaseva, E. Vaishlia, V.A. Klinkov and I. Kolesnikov	165

Chapter 6: Materials for Electronics and Optoelectronics

Thermal Annealing Effects on the Raman and Photoluminescence Properties of Mono and Few-Layer MoS₂ Films G. Munkhbayar, Ė. Nomin-Erdene and J. Davaasambuu	173
Preparation, Structure, and Photophysical Behavior of Europium (III) Complexes of Decyl Alanine and Lauryl Alanine J. Han, N. Gerile, Y. Zhang, Y.F. Shi, B. Altan and O. Tegus	179

Chapter 7: Cement Replacement Materials

Utilization of Magnesium-Rich Synthetic Gypsum as Partial Replacement Material in Concrete H.M. Noh, N.L.I.A. Mohamad, N.A. Idris, N. Kasim, R. Zainal and S.M.S. Musa	191
Properties of Self-Compacting Concrete Containing Palm Oil Fuel Ash and Rice Husk Ash A.N. Rizalman, M.K.M. Bisi, S.M.S.A. Razak and M.E. Mohamad	201
Enhancement of Autogenous Healing on Pre-Cracked PFA Concrete Using Response Surface Methodology (RSM) M.F. Md Jaafar, N. Ghazali, K.A. Shahid, R. Zailan, K. Muthusamy and F.M. Yahaya	213
Characterization and Strength Activity Index of Eggshell Powder and Silica Fume as Partial Cement Replacement A.N. Rizalman and B. Sibin	225
Effect of Mixing Anadara Granosa Shells Ash and Fly Ash as a Cement Replacement on Foamed Concrete Properties S.Z. Keumala Citra, Wahyuni, Munawir, R.F. Vito and T.I. Rais	233