

Geopolymer and Green Technology Materials

Selected, peer reviewed papers from the 2014 Malaysia-Indonesia Geopolymer Symposium (MIGS 2014), May 11-12, 2014, Kuala Lumpur, Malaysia

von

Mohd Mustafa Al Bakri Abdullah, Liyana Jamaludin, Muhammad Faheem Mohd Tahir, Andrei Victor Sandu

1. Auflage

Trans Tech Publications 2015

Verlag C.H. Beck im Internet:
www.beck.de

ISBN 978 3 03835 233 4

Table of Contents

Preface and Organization

Chapter 1: Aggregate

Effects of Lightweight Aggregate Size and Grading on the Residual Strength of Lightweight Geopolymer Concrete Exposed to Elevated Temperature O.A. Abdulkareem, M.M. Al Bakri Abdullah, H. Kamarudin and K.N. Ismail	3
Properties of Lightweight Bubbles Aggregate (LBA) for the Replacement of Coarse Aggregates in Concrete N.M. Ibrahim, L.Q. Wen, R. Che Amat, T. Abdul Majid, N.L. Rahim and S. Shamsuddin	11
Utilization of Recycled Glass Waste as Partial Replacement of Fine Aggregate in Concrete Production N.L. Rahim, R. Che Amat, N.M. Ibrahim, S. Salehuddin, S.A. Mohammed and M. Abdul Rahim	16
Compressive Strength of Concrete with Recycled Glass as Partial Aggregate Replacement R. Hamid and M.A. Zubir	21

Chapter 2: Geopolymer Technology

Production of Fiber Glass Reinforced Geopolymer Composite Pipe M.F. Abu Hashim, M.M. Al Bakri Abdullah, C.M.R. Ghazali, K. Hussin and M.F. Mohd Tahir	29
Review on Development of Clay Based Geopolymer Ceramic Composites A. Romisuhani, A.M.M. Al Bakri and J. Nur Ain	37
Effect of Particle Size on Properties of Sidoarjo Mud-Based Geopolymer Antoni, D. Wiyono, A. Vianthi, P. Putra, G. Kartadinata and D. Hardjito	44
Mechanical Properties of MIRHA-Fly Ash Geopolymer Concrete R. Bayuaji, M.F. Nuruddin, S. Francis, J.J. Ekaputri, Triwulan, S. Junaedi and H. Fansuri	49
Epoxy Layered-Silicates Filled with Fly Ash Based Geopolymer: Compressive Properties Y.M. Daud, H. Kamarudin, C.M. Ruzaidi, A.F. Osman and M. Al-Bakri	58
Light Weight Geopolymer Paste Made with Sidoarjo Mud (Lusi) J.J. Ekaputri, Triwulan, S. Junaedi, Fansuri and R.B. Aji	63
Kinetics of Geopolymer Solidification Study Using Texture Analyzer N.H. Zamri, L. Ismail, R.H. Abdul Rahim, A.A. Siyal, Z. Man and K.A. Azizli	75
Reviews on Clay Geopolymer Ceramic Using Powder Metallurgy Method N.A. Jaya, M.M. Al Bakri Abdullah and R. Ahmad	81
Effect of Alkaline Activators Concentration to the Strength and Morphological Properties of Wastepaper-Based Geopolymer Mortars A.R.M. Ridzuan, A.A. Khairulniza, M.A. Fadzil and J. Nurliza	88
Hybridization Effect of Kaolin and Calcium Carbonate on Tensile and Thermal Properties of Compatibilized Polypropylene Composites M.T.M. Faheem, M.M. Safwan and A.M.M. Al Bakri	93
Properties of Self-Compacting Geopolymer Concrete M.F. Nurudin and F.A. Memon	99
Properties of Geopolymer Concrete from Local Fly Ash (FA) and Palm Oil Fuel Ash (POFA) O. Monita, A. Kamaldi, I.R. Sitompul, I. Diyanto and E. Saputra	110
Investigation on the Degree of Reaction and Strength Performance of Fly Ash Based Geopolymer Binder with Alternative Chemical Reagents N. Rahman and A. Kusbiantoro	115
Effect of Solid/Liquid Ratio during Curing Time Fly Ash Based Geopolymer on Mechanical Property T. Rahmiati, K.A. Azizli, Z. Man, L. Ismail and M.F. Nuruddin	120

The Influence of Alkali Activator Concentration to Mechanical Properties of Geopolymer Concrete with Trass as a Filler P. Risdanareni, J.J. Ekaputri and Triwulan	125
Characterization of Soils as Potential Raw Materials for Soil Stabilization Application Using Geopolymerization Method S.Z.S. Zaliha, A.M.M. Al Bakri, H. Kamarudin and A. Fauziah	135
Fundamentals of Geopolymers and Related Alkali Activated Materials J. Temuujin, A. Minjigmaa, U. Bayarzul, T. Zolzaya, B. Davaabal and J. Amgalan	144
Lightweight Geopolymer Binder Base on Sidoarjo Mud Triwulan, J.J. Ekaputri and C. Huda	148
Rheology of High Volume Sidoarjo Mud Mortar T.H. Widodo, L. Chandra, Antoni and D. Hardjito	160
The Relationship between Water Absorption and Porosity for Geopolymer Paste Z.F. Farhana, H. Kamarudin, A. Rahmat and A.M.M. Al Bakri	166
Effect of NaOH Concentration on Microstructure of Boiler Ash Based Geopolymer Y. Zarina, A.M.M. Al Bakri, H. Kamarudin, I. Khairul Nizar and A.R. Razak	173
Comparison of Using NaOH and KOH Activated Fly Ash-Based Geopolymer on the Mechanical Properties R.H. Abdul Rahim, T. Rahmiati, K.A. Azizli, Z. Man, M.F. Nuruddin and L. Ismail	179
Effect of Sodium Silicate Types on the High Calcium Geopolymer Concrete A.R.M. Ridzuan, A.A. Khairulniza and M.F. Arshad	185
The Effect of NaOH Concentration and Curing Condition to the Strength and Shrinkage Performance of Recycled Geopolymer Concrete A.R.M. Ridzuan, M.M. Al Bakri Abdullah, M.F. Arshad, M.F. Mohd Tahir and A.A. Khairulniza	194

Chapter 3: Green Materials

Physical and Mechanical Properties of Fired Clay Brick Incorporating with Mosaic Sludge Waste A.S. Abdul Rahim and A.B.A. Kadir	203
Study on Quenching and Artificial Ageing on Al-Si Alloy D.C. Achitei, A.V. Sandu, M.M. Al Bakri Abdullah, P. Vizureanu and H. Kamarudin	209
The Experimental Determination of the Friction Stress between the Semi-Product and the Active Plate at the Multiaxial Forging of Copper A.M. Cazac, M.M. Al Bakri Abdullah, C. Predescu, A.V. Sandu and C. Bejinariu	216
Effect of Metakaolin on the Strength and Pore Size Distribution of Concrete Z. Hashim and R. Hamid	222
The Effect of Silicon Nitride Addition on Microstructure and Microhardness of SN100C Solder Alloy Using Powder Metallurgy M.I. Ramli, N. Saud, M.A.A. Mohd Salleh, M. Nazree Derman, R. Mohd Said and N. Nasir	228
Leachability of Fired Clay Brick Incorporating with Sludge Waste from Mosaic Industry A.A. Kadir, H.H. Jamil and A.S. Abdul Rahim	233
Development of Low Cost Sn-0.7Cu Base Composite Solder for High Temperature Application Z. Mahim, N. Saud and N.R.A. Razak	239
Comparison between Thermal Interface Materials Made of Nano Carbon Tube (NCT) with Gad Pad 2500 in Term of Junction Temperature by Using CFD Software, FluentTM M. Mazlan, A.M.M. Al Bakri, R. Wahab, A.K. Zulhisyam, M.R. Mohd Sukhairi, M.H.M. Amini and A. Mohammad Amizi	243
Thermal Properties of Polypropylene/Palm Kernel Shell Biocomposites: Effects of Amino Silane (APTÉS) M.S. Mohamed Omar, O.H. Lin, H.M. Akil, N.A.N. Nur Azza, M.M. Safwan and M.K.A. Sofiah	250
Effects of Electro Osmotic Consolidation in South West of Johor: Small Laboratory Scale K.N. Mohd Yusof, F. Ahmad, M.M. Al Bakri Abdullah and M.F. Mohd Tahir	255
Effect of Polypropylene-Methyl Polyhedral Oligomeric Silsesquioxane Compatibilizer in Polypropylene/Silica Nanocomposites: Mechanical, Morphological and Thermal Studies M.K.A. Sofiah, O.H. Lin, H.M. Akil and Z.A.M. Ishak	265

Design of Experiment (DOE) of Powder Metallurgy Technique in Fabricating SnCu/Carbon Lead-Free Composite Solder with Different Mixing Parameters S.A. Musa and N. Saud	269
Effect of TiO₂ Reinforcement on Microstructure and Microhardness of Low-Silver SAC107 Lead-Free Solder Composite Solder N.M. Nasir, N. Saud, M. Nazree Derman, A.A.M. Salleh, M.I.I. Ramli and R.M. Said	273
Comparison of Linear Interpolation Method and Mean Method to Replace the Missing Values in Environmental Data Set N.M. Noor, M.M. Al Bakri Abdullah, A.S. Yahaya and N.A. Ramli	278
Effect of Organic Modification on Dynamic Compression Properties of Polypropylene/Muscovite Layered Silicate Composites M.F. Omar, H. Jaya, H.M. Akil, Z.A. Ahmad, M.F.A. Rasyid and N.Z. Noriman	282
Properties of Concrete with Different Percentage of the Rice Husk Ash (RHA) as Partial Cement Replacement M. Abdul Rahim, N.M. Ibrahim, Z. Idris, Z.M. Ghazaly, S. Shahidan, N.L. Rahim, L.A. Sofri and N.F. Isa	288
An Innovation of the Palm Oil Based Wax as Industrial Wax for Machining Prototype Sustainable Products B. Rajamony and Z. Mohd Zain	294
Treatment Method for Dispersion of Carbon Nanotubes: A Review A.A. Sinar, M.A. Nur Azni, Z. Firuz, M.A. Hazizan, M.S. Siti Shuhadah and H.A. Sahrim	299
Hybrid Microwave-Assisted Rapid Sintering Process for Fabrication of Sn-0.7Cu+1.0wt.%Si₃N₄ Composite Solder F. Somidin, N. Saud and M.A.A. Mohd Salleh	305
Investigation of Epoxidized Natural Rubber (ENR 50) as a Compatibilizer on Cogon Grass Filled Low Density Polyethylene/Soya Spent Flour S.T. Sam, N. Hani, H. Ismail, N. Noriman and S. Ragunathan	310
Investigation of Noise Reduction Coefficient of Organic Material as Indoor Noise Reduction Panel T.N. Tengku Izhar, L.M. Deraman, W.N. Ibrahim and N.A. Lutpi	317
The Flexural Properties of Reinforced Recycled Glass Concrete Beam R. Hamid and M.A. Zubir	325
Testing on Building Material Using Waste Material in Fired Clay Brick A.A. Kadir, N.A. Sarani and A.M. Leman	330
Simulation of Nano Carbon Tube (NCT) in Thermal Interface Material for Electronic Packaging Application by Using CFD Software M. Mazlan, A.M.M. Al Bakri, R. Wahab, A.K. Zulhisyam, A.M. Iqbal, M.H.M. Amini and A.A. Mohammad	337
Effect of Surface Modification on Strain Rate Sensitivity of Polypropylene/Muscovite Layered Silicate Composites M.F. Omar, N.S. Abd Wahab, H.M. Akil, Z.A. Ahmad, M.F.A. Rasyid and N.Z. Noriman	343
Tensile Properties of Linear Low Density Polyethylene/Rambutan Peels (<i>Nephelium chryseum</i> Blum.) Flour Blends A.A. Nadhirah, S.T. Sam, N.Z. Noriman, C.H. Voon and S.S. Samera	348

Chapter 4: Coating

The Effect of Si/Al Ratio and Sodium Silicate on the Mechanical Properties of Fly Ash Based Geopolymer for Coating A. Asif, Z. Man, K.A. Mohd Azizli, M.F. Nuruddin and L. Ismail	355
Microstructure Study on Cuprous Oxide Thin Films Deposited on <i>n</i>-Si Substrate via Sol-Gel Spin Coating Technique D.S. Che Halin, N. Saud and H. Haroon	362
Geopolymer: A Review on Physical Properties of Inorganic Aluminosilicate Coating Materials M. Norkhairunnisa and M.N.M. Fariz	367