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Judul Karya Ilmiah (artikel : Improved Understanding of the Pozzolan Behaviour of MSWI fly ash with Ca(OH)₂ solution

Nama Penulis : Athanasius P. Bayuseno, Wolfgang W. Schmahl
 Jumlah Penulis : 2
 Status Pengusul : Penulis pertama/penulis ke-1/Penulis korespondensi*
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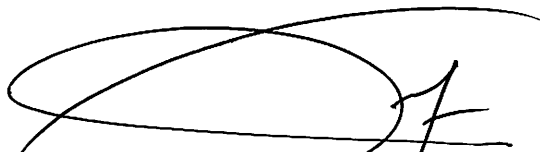
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Semarang, 12 Desember 2020

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 Unit Kerja : Teknik Kimia FT UNDIP

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Improved understanding of the pozzolanic behaviour of MSWI fly ash with $\text{Ca}(\text{OH})_2$ solution

Bayuseno A.P.^a , Schmahl W.W.^b

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^a Department of Mechanical Engineering, Diponegoro University, Campus Tembalang, Semarang, 50255, Indonesia

^b Department of Geo- and Environmental Science, Ludwig-Maximilians University of München, Germany

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The study aims at investigating pozzolanic behaviour of MSWI fly ash in a saturated $\text{Ca}(\text{OH})_2$ solution at various times. The raw and water-washed fly ashes were selected for the pozzolanic solidification experiment to which mass ratios of the solution to ash (ml/g) were adjusted to be 3 and 10, whereas the solidification times were set from 7 to 28 days and from one to three months. From the XRD Rietveld analysis, a mineral assemblage of fly ash exhibited pozzolanic reactivity to form compounds of hydraulic cementitious materials. Here the considerable amounts of syngenite and gypsum, but small amounts of ettringite, hydrocalumite and C-S-H phase, were produced during the pozzolanic reaction

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Bruno Milanez, Jorge Hargrave, Gustavo Luedemann

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Adrianus Amheka, Yoshiro Higano, Takeshi Mizunoya, Helmut Yabar

15(1), pp. 86–98

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Improved understanding of the pozzolanic behaviour of MSWI fly ash with Ca(OH)₂ solution

Athanasius P. Bayuseno*

Department of Mechanical Engineering,
Diponegoro University,
Campus Tembalang, Semarang, 50255, Indonesia
Email: apbayuseno@gmail.com
*Corresponding author

Wolfgang W. Schmahl

Department of Geo-and Environmental Science,
Ludwig-Maximilians University of München, Germany
Email: wolfgang.schmahl@lrz.uni-muenchen.de

Abstract: The study aims at investigating pozzolanic behaviour of MSWI fly ash in a saturated Ca(OH)₂ solution at various times. The raw and water-washed fly ashes were selected for the pozzolanic solidification experiment to which mass ratios of the solution to ash (ml/g) were adjusted to be 3 and 10, whereas the solidification times were set from 7 to 28 days and from one to three months. From the XRD Rietveld analysis, a mineral assemblage of fly ash exhibited pozzolanic reactivity to form compounds of hydraulic cementitious materials. Here the considerable amounts of syngenite and gypsum, but small amounts of ettringite, hydrocalumite and C-S-H phase, were produced during the pozzolanic reaction of raw fly ash. Likewise, the washed fly ash exhibited the cementitious property with high quantity of gypsum and ettringite. From the leaching test, the solidified products exhibited release of lesser heavy metals about the untreated parent materials.

Keywords: pozzolanic solidification; MSWI fly ash; cementitious property; Rietveld analysis; mineralogical analysis.

Reference to this paper should be made as follows: Bayuseno, A.P. and Schmahl, W.W. (2015) 'Improved understanding of the pozzolanic behaviour of MSWI fly ash with Ca(OH)₂ solution', *Int. J. Environment and Waste Management*, Vol. 15, No. 1, pp.39–66.

Biographical notes: Athanasius P. Bayuseno is a Professor in Materials Science and Engineering and Head of Graduate Program in Mechanical Engineering at the Diponegoro University. He received his BSc in Mechanical Engineering from Gadjah Mada University, Indonesia, MSc in Applied Physics from Curtin University Australia and PhD in Mineralogy from Ruhr University of Bochum, Germany. His teaching interests are in ceramics, materials science and engineering. His research interests cover many aspects of ceramics design, applied crystallography including the materials characterisation and waste processing.

Effect of MgO additive on preventing leakage of Cr(VI)

Jin-Chun Chai*

Department of Civil Engineering and Architecture,
Saga University,
1 Hojyo-Machi, Saga 840-8502, Japan
Email: chai@cc.saga-u.ac.jp
*Corresponding author

Takanori Hino

Institute of Lowland and Marine Research,
Saga University,
1 Hojyo Machi, Saga 840-8502, Japan
Email: hino@ilt.saga-u.ac.jp

Satoshi Shimoda

Geo-disaster Prevention Group, Nagoya Branch,
Nippon Koei Co. Ltd.,
2-17-14, Higashisakura, Higashi-ku Nagoya-shi,
Aichi, 461-0005, Japan
Email: shimoda-st@n-koei.jp

Shuilong Shen

State Key Laboratory of Ocean Engineering,
School of Naval Architecture, Ocean, and Civil Engineering,
Shanghai Jiao Tong University,
800 Dong Chuan Road, Minhang,
Shanghai 200240, China
Email: slshen@sjtu.edu.cn

Abstract: The effect of a new additive, oxide magnesium (MgO), on preventing or reducing the leakage of Cr(VI) from a fly ash (coal ash) has been investigated by batch contact and column percolation tests. The test results indirectly indicate that the MgO additive has an obvious effect on reducing Cr(VI) to Cr(III), which is less environmentally hazardous. However, the process of reducing Cr(VI) to Cr(III) may be reversible because adding H₂SO₄ or CaH₂O₂ into the balanced solid-liquid mixture for partially simulating possible environmental change increased Cr(VI) concentration in the liquid phase. Adding 10% to 30% of Ariake clay into the fly ash not only further reduced Cr(VI) concentration, but also reduced total Cr concentration. Hence, Cr(III) ions may be absorbed by the clay minerals. For the conditions investigated, the column percolation test resulted in higher initial Cr(VI) concentration in the liquid phase than that of the batch contact test. Further, the

Urban environmental services: valuing the environmental benefits of solid waste recycling in Brazil

Bruno Milanez*

Departamento de Engenharia de Produção e Mecânica,
Universidade Federal de Juiz de Fora,
36036-330, Juiz de Fora, MG, **Brazil**
Email: bruno.milanez@ufjf.edu.br
*Corresponding author

Jorge Hargrave

Institute of Applied Economics Research
SBS, Quadra 1, Bloco J,
70076-900, Brasília, DF, Brazil
Email: jorge.hargrave@ipea.gov.br

Gustavo Luedemann

Ministry of Science, Technology and Innovation,
Esplanada dos Ministérios, Bloco E,
70067-900, Brasília, DF, Brazil
Email: gustavo.luedemann@mct.gov.br

Abstract: Taking into account environmental and economic aspects, this research aims at estimating the environmental services produced by municipal solid waste (MSW) recycling. The text values the urban environmental services associated with the recycling of steel, aluminium, paper, plastic and glass present in MSW in Brazil. Estimates indicate that benefits of current recycling rates reaches something between US\$ 1.1 billion and US\$ 2.4 billion per year; moreover, if all recyclable material were recycled, such benefits would increase up to US\$ 5.2 billion.

Keywords: environmental services; ecosystem services; urban environmental services; municipal solid waste; MSW; recycling; Brazil.

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Biographical notes: Bruno Milanez is an Industrial Engineer. He holds a Masters in Urban Engineering and a PhD in Environmental Policy. He is Lecturer at the Industrial and Mechanical Engineering Department at the Federal University of Juiz de Fora, Brazil.