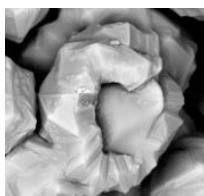


3rd International Conference on Competitive Materials and
Technology Processes

Miskolc-Lillafüred, Hungary
October 6-10, 2014

BOOK OF ABSTRACTS

Edited by
László A. GÖMZE



ic-cmtp3

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PREFACE

The competitiveness is one of the most important component of our life and it plays key role in efficiency both of organizations and societies. The more scientific supported and prepared organizations develop more competitive materials with better physical, mechanical, chemical and biological properties and the leading companies are applying more competitive equipment and technology processes. The aims the 3rd International Conference on Competitive Materials and Technology Processes (**ic-cmtp3**) and the Symposiums **is-icbm1** and **is-icm1** are the followings:

- Promote new methods and results of scientific research in the fields of material, biological, environmental and technology sciences;
- Change information between the theoretical and applied sciences as well as technical and technological implantations.
- Promote the communication between the scientist of different nations, countries and continents.

Among the major fields of interest are innovative materials with increased physical, chemical, biological, medical, thermal, mechanical properties and dynamic strength; including their crystalline and nano-structures, phase transformations as well as methods of their technological processes, tests and measurements. Multidisciplinary applications of material science and technological problems encountered in sectors like ceramics, glasses, thin films, aerospace, automotive and marine industry, electronics, energy, construction materials, medicine, biosciences and environmental sciences are of particular interest.

In accordance to the program of the conference **ic-cmtp2**, and Symposiums **is-icbm1** and **is-icm1** more than **350** inquiries and registrations from different organizations were received. Finally more than **240** abstracts were accepted for presentation. From them **12** are PLENARY lectures, and **112** ORAL presentation. Scientists and researchers have arrived to Miskolc-Lillafüred (Hungary) from **41** countries of Asia, Europe, Africa, North and South America.

In this book are presented abstracts from more than **700** authors and co-authors.

Prof. Dr. László A. Gömze
chair, ic-cmtp3

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is-icm1

**The 1st International Symposium on Innovative
Construction Materials**

Performance Characteristics of Waste Glass Powder Substituting Portland Cement in Mortar Mixtures

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In several countries, waste glass causes environmental concerns as quantities stockpiled exceed recycling in the packaging stream. Being amorphous and having relatively high silicium and calcium contents, glass is pozzolanic or even cementitious, when finely ground. Reducing particle sizes typically to less than 100 µm may give control over the alkali-silica reaction in concrete, therefore making this material a possible substitute to Portland cement. Such use may moderate the problem of dumped waste glass and reduce CO₂ emissions into the atmosphere by decreasing the proportion of cement in unit volume of concrete produced.

In present work, soda-lime glass cullet (flint, amber, green) and special glass cullet (fluorescent lamp tube glass waste cullet and incandescent light bulb borosilicate glass waste cullet) were ground into fine powders in a laboratory planetary ball mill for 30 minutes. CEM I 42.5N Portland cement was applied in mortar mixtures, substituted with waste glass powder at levels of 20% and 30%. Characterisation and testing of waste glass powders included fineness by laser diffraction particle size analysis, specific surface area by nitrogen adsorption technique, bulk and particle density by picnometer and chemical analysis by X-ray fluorescence spectrophotometry. Heat of hydration of cement pastes and workability of fresh mortars were also determined. Compressive and flexural strength, volume stability, early age cracking and drying shrinkage tests were performed to observe the influence of waste glass powder substitution for Portland cement on physical and engineering properties of mortar mixtures.

Keywords: waste glass powder, cement substitution, characterisation