

Foreword to the special issue of International Conference of Sustainable Building Materials 2019 (ICSBM 2019)

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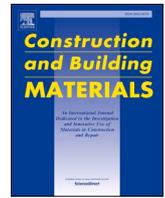
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Foreword to the special issue of International Conference of Sustainable Building Materials 2019 (ICSBM 2019)

1. Conference presentation

The building sector is by far the largest consumer of raw materials and producer of human-made materials. From a sustainability and circularity point of view, the effects of this demand can among others be mitigated using biogenic resources, smart material design, enhanced durability, functionalization, reuse and recycling, and the use of side streams ("waste"). The conference on sustainable building materials addresses this challenge starting from a scientific approach: building materials science is a syncretic discipline hybridizing mineralogy, ceramics, solid-state physics, chemistry, metallurgy, and biology. Advanced characterization and treatment methods, together with novel technologies and modelling tools, are vital for the study and improvement of the complete life cycle of building materials, from raw materials to production, use, and recycling.

Following the success of the previous edition in Wuhan in 2017, the organization of the 2nd International Conference on Sustainable Building Materials, ICSBM 2019, took place in Eindhoven, the Netherlands, by 12–15 August 2019.

The individual technical papers submitted to the conference ICSBM 2019 were 80 in total. 17 of the most interesting scientific papers were selected for this special issue. This selection was performed by a peer review process and the papers were evaluated based on quality, innovation, and relevance, a process in which the scientific committee participated. The papers selected belong both to attendants of the conference and keynote speakers to make sure that all the participants could contribute to the content and quality of this special issue.

The conference ICSBM 2019 was organized for 3 consecutive days. Keynote speakers among the world's most well-known researchers in the field of building materials, provided lectures every morning. The complete list of the keynote speakers can be found in the table below, together with their speech topics.

Name	Affiliation	The topic of the Keynote session
Prof. Karen Scrivener	EPFL, Switzerland	Hydration of Portland cement
Prof. Harald Justnes	SINTEF, Norway	Performance of SCMs – Chemical and physical principles
Prof. Caijun Shi	Hunan University, China	On the setting and hardening control of alkali-activated slag cement
Dr. Jan van Dam	Wageningen University and Research, The Netherlands	Biobased building materials
Prof. Herbert Pöllmann		

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Name	Affiliation	The topic of the Keynote session
	Martin Luther University Halle-Wittenberg, Germany	Natural and artificial Pozzolanes – Industrial residues and natural supplementary materials
Prof. Mirja Illikainen	University of Oulu, Finland	Utilization of waste and residues in building materials
Dr. Mohammed Sonebi	Queen's University, Great Britain	Natural fibers in building materials
Prof. Zhonghe Shui	Wuhan University of Technology, China	Cementitious materials for marine structures
Prof. Shinichi Igarashi	Kanazawa University, Japan	Techniques for analyzing microstructures
Prof. Jørgen Skibsted	Aarhus University, Denmark	NMR spectroscopy of SCMs-cement blends
Prof. Alexander Van Herk	A-STAR, Singapore	Functional coatings for building materials
Dr. Wolfram Schmidt	BAM, Berlin	Bio-based admixtures
Prof. Zongjin Li	University of Macao, China	Application of new concrete processes and materials
Prof. Peiyu Yan	Tsinghua University, China	Use of Supplementary Cementitious Materials to Manufacture High-Performance Concrete
Prof. Mark Tyrer	Coventry University, UK	Energy Efficiency of building materials
Prof. Christoph Gehlen	TU Munich, Germany	Specification of building materials for in-service durability

The total number of presentations performed during the parallel session (excluding the keynote speakers) was 80, while the posters were about 20, for a total of over 100 contributions. The 180+ participants come from more than 36 different countries, making the ICSBM2019 a great international event.

Parallel presentation sessions and poster sessions were clustered in five main topics characterized, to present most of the building material innovative approaches:

1. New cementitious binders:

Engineered OPCs, supplementary cementitious binders, alkali-activated binders, calcium sulfoaluminate cement (CSA), magnesium oxychloride cement (MOC), calcined clays, hydration, modelling, performance, durability.

2. Green materials/products:

Concrete, autoclaved aerated concrete, gypsum wallboards, fired

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clay, unconventional clays and aggregates, alternative chemical admixtures, and (repair) mortars.

3. Waste recovery, treatments, and valorisation:

Municipal solid waste incineration residues, steel converter slags, mine tailings, paper sludge incineration ashes, biomass incineration ashes, characterization of waste residues, enhancing treatments (physical, chemical, and thermal), alternative raw materials, second life, environmental impact, modelling of hydration and leaching.

Titles	Authors
Sustainability of durable concrete reinforced with aluminum metal	Harald Justnes
Electrodialytically treated MSWI fly ash use in clay bricks	Lorena Skevi, Lisbeth M. Ottosen, Gunvor M. Kirkelund
Design of reinforced concrete slabs with consideration of the construction joints	V. Kurochkina, I. Yakovleva, A. Deineko, A. Starostin
HYDCEM: A new cement hydration model	Niall Holmes, Denis Kelliher and Mark Tyrer
The Effect of NaOH Concentration on the Mechanical and Physical Properties of Alkali Activated Fly Ash-Based Artificial Lightweight Aggregate	Puput Risdanareni, Katrin Schollbach, Jianyun Wang, Nele De Belie
Influence of External Water Introducing by Coral Sand on Autogenous Shrinkage and Microstructure of Ultra-High Performance Concrete (UHPC)	Kaizhi Liu, Zhonghe Shui, Rui Yu, Shuangqin Y
Neutron radiography to study water ingress via the interlayer of 3D printed cementitious materials	Jolien, Van Der Putten, Mahzad, Azima, Philip, Van den Heede, Tim, Van Mullem, Geert, De Schutter and Kim, Van Tittelboom
Influence of heat treatment and mechanical activation on reactivity of natural pozzolan for geopolymer synthesis	Rafia Firdous, Dietmar Stephan
Sewage sludge ash as resource for phosphorous and material for clay brick manufacturing	Lisbeth M. Ottosen, Ida M.G. Bertelsen, Pernille E. Jensen & Gunvor M. Kirkelund
The effect of MgO on the structure and chemical composition of C-S-H gels	Yanjie Tang, Wei Chen
Investigation of the zonation of thermally treated ultra high performance concrete	M. Voigt, J. von Werder, B. Meng
Assessment of mine tailings as precursors for alkali-activated materials for on-site applications	R. Obenaus-Emler, M. Falah, M. Illikainen
The Effects of Epoxy Resin as Partial Cement Replacement on the Mechanical Properties of Concrete	Gul Ahmed Jokhio, Yasmeen Gul, Abid Abu-Tair, Gan Shang Wei
Experimental development of alternative lightweight concretes	Daia Zwicky
Fire resistance of aerated alkali-activated cements	J. Rodriguez-Sanchez, M. Fedorciuc-Onisa, H. Kinoshita, J.L. Provis, S. MacLachlan
The impact of slag fineness on the reactivity of blended cements with high-volume non-ferrous metallurgy slag	Vincent Hallet, Nele De Belie, Yiannis Pontikes
Safe Use of Sustainable Building Materials: A reappraisal of Adobe	T. Li Piani, J.Weerheijm, L. Koene and L. J. Sluys
A concrete composite from biologically based binders and mineral aggregates for constructional 3D-printing	J. Christ, H. Koss, L.M. Ottosen
A silica aerogel synthesized from olivine and its application as a photocatalytic support	Y.X. Chen, Y. Hendrix, K. Schollbach, H.J.H Brouwers
The recycling potential of waste wood into wood-wool/cement composite	F. Berger, F. Gauvin, and H.J.H. Brouwers
Suitability of phenolphthalein indicator method for alkali activated concrete	Olalekan O. Ojedokun, P.S. Mangat
Methods for determining and tracking the residual cement paste content of recycled concrete	P.M.F. van de Wouw, M.V.A. Florea, H.J.H. Brouwers I
Self-cleaning and air purification performance of Portland cement paste with low dosage of nanodispersed TiO2 coatings	Zixiao Wang, Florent Gauvin, Pan Feng, H.J.H. Brouwers, Qingliang Yu
Specification of building materials for in service durability	C. Gehlen, C. Thiel

4. Biogenic materials:

Biofibres, bio aggregates, alternative natural fibres, and agricultural and biorefinery residues.

5. Functionalized materials:

Nano-engineered, coated, photocatalytic, self-cleaning, self-healing, hydrophobic.

Thematic parallel session workshops were also taking place during one of the afternoons. The participants were provided with the material needed for the workshop, still available on ICSBM 2019 website.

Three main topics were available:

1. From microscopic to macroscopic observations on cement systems

(Prof. H. Poellmann and Prof. S. van der Laan, Martin-Luther-Universität Halle-Wittenberg and Eindhoven University of Technology).

This workshop addresses how Microscopic observations can be quantified and related to Bulk material characteristics and the requirement of consistency between various complementary analytical techniques.

2. Additive Concrete Manufacturing/3D Concrete Printing

(Prof. Th. Salet and Prof. C. Gehlen, Eindhoven University of Technology and Technical University of Munich).

This workshop introduces new users to 3D printing technologies, approaching both extrusion printing and particle bed printing. The workshop is oriented to students with no experience in 3D printing, and willing to have a complete experience in this innovative technology.

3. Modeling cement chemistry using PHREEQC (Prof. M. Tyrer, Prof. A. Watson & Prof. A. West, Coventry University)

This workshop introduces new users to model the interaction of cement hydrates with pore solutions by simulating thermodynamic equilibrium using PHREEQC. The major part of the training course is

concerned specifically with cement hydrate chemistry and examines how ideal and non-ideal solid solution behavior may be simulated.

ICSBM 2019 was held in collaboration with Wuhan University of Technology and sponsored by several companies like:

RILEM, Eltomation, CRH, TataSteel, PCA (American cement manufacturers), VDZ, ACI, CBMA.

We also acknowledge the help and support of the Organizing Committee composed by:

Conference Chairman: Prof. H.J.H. (Jos) Brouwers, Eindhoven

Conference Co-Chairman: Prof. Wen Chen, Wuhan

Conference Secretary: Dr. M.V.A. (Miruna) Florea, Eindhoven

Dr. Qiu Li, Wuhan

Dr. Bo Yuan, Wuhan

Dr. Q. Yu, Eindhoven

Dr. F. Gauvin, Eindhoven

Mrs. K. Schollbach, Eindhoven

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Mr. Y. Chen, Eindhoven

Mrs. L.T.J. Harmsen, Eindhoven

Mrs. N.L. Rombley, Eindhoven

List of accepted manuscripts for the special issue of Construction and Building Materials:

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