

CEEC-TACS & Medicta2019

**BOOK
OF
ABSTRACTS**

Editors:

Andrei Rotaru

Stefano Vecchio Cipriotti



**5th Central and Eastern European Conference on
Thermal Analysis and Calorimetry
&
14th Mediterranean Conference on
Calorimetry and Thermal Analysis**

**27-30 August 2019
Roma, Italy**

Book of abstracts of the 5th Central and Eastern European Conference on Thermal Analysis and Calorimetry (CEEC-TAC5) and 14th Mediterranean Conference on Calorimetry and Thermal Analysis (Medicta2019).

5th Central and Eastern European Conference on Thermal Analysis and Calorimetry (CEEC-TAC5) and
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27-30 August 2019

Roma

Italy

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Publisher: Central and Eastern European Committee for Thermal Analysis and Calorimetry (CEEC-TAC)

Publishing House: *Academica Greifswald, Germany*

ISBN 978-3-940237-59-0

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Organizers

**The 5th Central and Eastern European Conference
on Thermal Analysis and Calorimetry**

&

**The 14th Mediterranean Conference on
Calorimetry and Thermal Analysis**

CEEC-TAC5 & Medicta2019

27-30 August 2019 – Roma, Italy

is organized by the:

**Central and Eastern European Committee for
Thermal Analysis and Calorimetry (CEEC-TAC),**

Italian Association for Calorimetry and Thermal Analysis (AICAT),

**Interdivisional Group of Calorimetry and Thermal Analysis (GICAT)
of the Italian Society of Chemistry,**

**Sapienza University of Rome (SUR), Dipartimento di Scienze di Base
e Applicate per l'Ingegneria Sapienza (SBAI),**

University of Craiova (UCV),

National Institute for Laser, Plasma and Radiation Physics (INFLPR),

**Institute of Physical Chemistry "Ilie G. Murgulescu" (ICF)
of the Romanian Academy**



Dear Participants at CEEC-TAC5 & Medicta2019 Conference,

Let us express our great pleasure to welcome you here in Roma - Italy, for attending the joint 5th Central and Eastern European Conference on Thermal Analysis and Calorimetry (CEEC-TAC5) and 14th Mediterranean Conference on Calorimetry and Thermal Analysis (Medicta2019) between 27th and 30th of August 2019; we thank very much to all 372 of you for joining us! Since “All Roads Lead to Roma”, it was somehow natural to meet here this time! Roma is the largest city of Italy and also its capital. It is an impressive cosmopolitan city with an artistic, architectural and cultural history that has influenced the whole world and dates back to almost 3000 years ago.

Now, the joint event CEEC-TAC5 & Medicta gathers 372 registered participants from 38 countries and of 6 continents, presenting a total number of 449 scientific works. Of those, 4 are Plenary Lectures (PL), 3 are Award Plenary Lectures (APL), 16 are Invited Lectures (IL), 4 Parallel Sessions of Oral Presentations – 108 contributions (OP) & 3 Sessions of Poster Presentation – 320 contributions (PS). An important task of CEEC-TAC5 & Medicta2019 is the continuation of 2 distinctive directions the conference follows, with 2 Workshops (WS) introducing the subjects:

1) *Advanced Functional Materials*; 2) *Kinetics & Lifetime Prediction of Materials (KLTPM)*.

At this edition, Awards will be offered to exceptional scientists: *i*) Prof. Janos Kristof from Hungary (Honorary Member of CEEC-TAC), *ii*), Prof. Vahur Oja from Estonia (Distinguished TA&C Researcher in Central & Eastern Europe); *iii*) Prof. Kestutis Baltakys from Lithuania (Outstanding Young TA&C Researcher in Central & Eastern Europe); three *iv*) “Andrzej Malecki” 2019 Grants for Best Young Researcher from Central & Eastern Europe in the field of Thermal Analysis and Calorimetry; four *v*) “Jaroslav Sestak” 2019 Travel Grant for Best Student from Central & Eastern Europe and from Mediterranean Area in the field of Thermal Analysis and Calorimetry.

We would like to express our thanks to the people who contributed and supported the organization of this event, especially to the members of the Honorary Committee, Scientific Committee, International Organizing Committee, National Associations for Thermal Analysis and Calorimetry from Central and Eastern European countries and those from the Mediterranean area, Executive Organizing Committee, Central and Eastern European Committee for Thermal Analysis and Calorimetry, Italian Association for Calorimetry and Thermal Analysis (AICAT), Interdivisional Group of Calorimetry and Thermal Analysis (GICAT) of the Italian Chemical Society, Sapienza University of Rome (SUR) and the Department of Basic and Applied Sciences for Engineering of SUR, University of Craiova, INFLPR-National Institute for Laser, Plasma and Radiation Physics, and Institute of Physical Chemistry “Ilie Murgulescu” of the Romanian Academy. We acknowledge the great support of our Sponsors: MPstrumenti & LINSEIS, METTLER TOLEDO, RIGAKU, HITACHI, DSC CONSUMABLES (Gold Sponsors), NETZSCH (Bronze Sponsor) and our Partners: ECO Ricerche, Thorn Scientific Services Ltd. A special acknowledgement has to be addressed to the *Journal of Thermal Analysis and Calorimetry*, *Ceramics International*, *Applied Clay Science*, *Journal of Mining and Metallurgy, Section B: Metallurgy*, where one of their volumes will be dedicated to research papers of our conference, presented as oral or poster contributions.

The 4-day meeting is hosted at the Rectorate Building of the Sapienza University of Rome, which is located close to the historic centre. The official language of the conference is English.

We hope that you will enjoy the city during your stay at the CEEC-TAC5 & Medicta2019 conference, and that you will leave Roma with the same good feelings and memories as those after attending the previous conferences. We expect that this conference will give you novel scientific and practical knowledge, and enrich you with a variety of new contacts.

Looking forward to seeing you at forthcoming thermal analysis and calorimetry conferences, and hopefully in 2021 for CEEC-TAC6 and Medicta2021!

Stefano Vecchio Cipriotti & Andrei Rotaru
Chairmen of CEEC-TAC5 & Medicta2019

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General Information

The joint event “5th Central and Eastern European Conference on Thermal Analysis and Calorimetry (CEEC-TAC5) & 14th Mediterranean Conference on Calorimetry and Thermal Analysis (Medicta2019)” has gathered **372 registered participants** from **38 countries** and of **6 continents**, presenting a total number of **451 scientific works**. Of those, 4 are Plenary Lectures (**PL**), 3 are Award Plenary Lectures (**APL**), 16 are Invited Lectures (**IL**), 4 Parallel Sessions of Oral Presentations – 108 contributions (**OP**) & 3 Sessions of Poster Presentation – 320 contributions (**PS**). Each session of oral presentations is comprised of 27 works, poster session 1 and 2 include 106 works each, while poster session 3 has 108 works.

An important task of CEEC-TAC5 & Medicta2019 is the continuation of 2 distinctive directions that the first conference follows, with 2 Workshops (**WS**) introducing the subjects:

- 1) *Advanced Functional Materials*;
- 2) *Kinetics and Lifetime Prediction of Materials (KLTPM)*.

Plenary Lectures

- *Kestutis Baltakys* (Kaunas University of Technology, Lithuania)
- *Dimitrios N. Bikiaris* (Aristotle University of Thessaloniki, Greece)
- *Nobuyoshi Koga* (Hiroshima University, Japan)
- *Janos Kristof* (University of Pannonia, Hungary)
- *Vahur Oja* (Tallinn University of Technology, Estonia)
- *Crisan Popescu* (KAO European Research Laboratory, Germany)
- *Henrik Rudolph* (Applied Surface Science, Elsevier, the Netherlands)

Invited Lectures

- *Arnon Chaipanich* (Chiang Mai University, Thailand)
- *Svetlana Danilova-Tretiak* (A.V. Luikov Heat&Mass Transfer Institute, Belarus)
- *Ahmed El-Sabbagh* (Ain Shams University, Egypt)
- *Nathanael Guigo* (University of Cote d'Azur, France)
- *Tiit Kaljuvee* (Tallinn University of Technology, Estonia)
- *Dana Luca Motoc* (Transilvania University of Brasov, Romania)
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- *Wojciech Marczak* (Jan Dlugosz University in Czestochowa, Poland)
- *Jonjaua Ranogajec* (University of Novi Sad, Serbia)
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- *Kseniya Zherikova* (Nikolaev Institute of Inorganic Chemistry, Russian Federation)

Aggregate reactivity to the alkali-silica reaction (ASR) in ground aggregate-cement pastes

Brendan Boyd-Weetman, Paul Thomas

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A range of standard accelerated test methods for the screening of aggregates for susceptibility to the alkali-silica reaction (ASR) which causes deleterious cracking in concrete structures are available worldwide and two standard test have been recently adopted in Australia (AS 1141.60.1 (Accelerated mortar bar test (AMBT)) and AS 1141.60.2 (concrete prism test (CPT))). These accelerated test methods are empirical and based on expansion measurement correlated to field performance.

The mechanism of deleterious ASR resulting in cracking involves two processes; the chemical processes involved in the formation of the expansive ASR gel and the mechanical action of the ASR gel of the concrete in crack formation. Expansion tests, although empirical in nature are important as they probe the mechanical potential of the reactivity of aggregates. The chemical processes involved in the phase development are also important as they provide the gel responsible for cracking and understanding these processes can lead to more effective methods of mitigation of ASR as well as alternative methods for the screening of aggregates for reactivity to ASR. This paper focusses on correlating reactivity of aggregates determined using the standard test methods with phase development in paste tests using ground aggregate-cement pastes aged under accelerated conditions.

Two aggregates are investigated in this study, a micro-diorite (CPT non-reactive) and a greywacke (CPT reactive) which have been selected because of their relative reactivity to standard test methods. Both contain quartz as the phase potentially reactive to ASR. The aggregates were initially fine ground in a ring mill in order to make paste specimens using a general purpose Portland cement. Pastes specimens were prepared using a 3 to 1 aggregate to cement ratio with a water to cement ratio of 0.7. Pastes were initially hardened for 24 before stripping from the moulds and aging in alkali media (1 M NaOH) at elevated temperature (40, 60 and 80°C) for periods up to 84 days. Specimens were recovered, crushed and dried in a vacuum oven for 24 hours at 105°C prior to grinding in the ring mill and characterising using XRD, TG and FTIR for phase analysis.

Phase development with age based on the calcium hydroxide OH stretch in the FTIR, the decomposition step in the TG and the (101) peak in the XRD and the (101) quartz peak in the XRD is reported. Characterisation for the full aging period will be reported at CEEC-TAC5 – MMEDICTA 2019; however, results to date indicate that for these quartz containing aggregates, the relative reactivity can be correlated to the quartz reactivity and the calcium hydroxide consumption.