

**CEEC-TAC6 & Medicta2021**

**BOOK  
OF  
ABSTRACTS**

**Editors:**

**Andrei Rotaru**

**Matko Erceg**



**6<sup>th</sup> Central and Eastern European Conference on  
Thermal Analysis and Calorimetry  
&  
15<sup>th</sup> Mediterranean Conference on  
Calorimetry and Thermal Analysis**

**20-24 July 2021  
Split, Croatia**

**Book of abstracts of the 6<sup>th</sup> Central and Eastern European Conference on Thermal Analysis and Calorimetry (CEEC-TAC6) and 15<sup>th</sup> Mediterranean Conference on Calorimetry and Thermal Analysis (Medicta2021).**

6<sup>th</sup> Central and Eastern European Conference on Thermal Analysis and Calorimetry (CEEC-TAC6) and  
15<sup>th</sup> Mediterranean Conference on Calorimetry and Thermal Analysis (Medicta2021).

20-24 July 2021

Split

Croatia

**Editors:**

Andrei Rotaru, Matko Erceg

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## Organizers

**The 6<sup>th</sup> Central and Eastern European Conference  
on Thermal Analysis and Calorimetry**

**&**

**The 15<sup>th</sup> Mediterranean Conference on  
Calorimetry and Thermal Analysis**

*CEEC-TAC6 & Medicta2021*

*20-24 July 2021 – Split, Croatia*

*is organized by the:*

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

**Committee for Thermal Analysis & Calorimetry of the  
Croatian Society of Chemical Engineers (HDKIT),**

**University of Split (Sveuceliste u Splitu),**

**Faculty of Chemistry and Technology (KTF) of the University of Split,**

**University of Craiova (UCv),**

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



# CEEC-TAC

**Central and Eastern European Committee for  
Thermal Analysis and Calorimetry**



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## **Dear Participants at CEEC-TAC6 & Medicta2021 Conference,**

Let us express our great pleasure to welcome you here in Split - Croatia, for attending the joint 6<sup>th</sup> Central and Eastern European Conference on Thermal Analysis and Calorimetry (CEEC-TAC6) and 15<sup>th</sup> Mediterranean Conference on Calorimetry and Thermal Analysis (Medicta2021) between 20<sup>th</sup> and 24<sup>th</sup> of July 2021; we thank very much to all 180 of you for joining us! You were invited in Split, which is the second largest city of Croatia. The city has rich history, as it was founded as the Greek colony of Aspalathos in the 3<sup>rd</sup> or 2<sup>nd</sup> century BC on the coast of the Illyrian Dalmatae, and later on was home to Diocletian's Palace, built for the Roman emperor in AD 305. Nowadays, Split is a modern city, with a vibrant cultural life.

The joint event CEEC-TAC6 & Medicta2021 gathers now 180 registered participants from 25 countries, presenting a total number of 176 scientific works. Of those, 4 are Plenary Lectures (PL), 10 are Invited Lectures (IL), 4 Parallel Sessions of Oral Presentations – 64 contributions (OP) & 3 Sessions of Poster Presentation – 112 contributions (PS). Each session of oral presentations is comprised of 16 works, while two poster presentations include 37 works and one includes 38 works.

At this edition, Awards will be offered to exceptional scientists: *i*) Prof. Herbert Danninger from Austria (Honorary Member of CEEC-TAC), *ii*), Prof. Thomas Maskow from Germany (Distinguished TA&C Researcher in Central & Eastern Europe); *iii*) Dr. Nina Obradovic from Serbia (Outstanding Young TA&C Researcher in Central & Eastern Europe); three *iv*) “Andrzej Malecki” 2021 Grants for Best Young Researcher from Central & Eastern Europe and from the Mediterranean Area in the field of Thermal Analysis and Calorimetry; two *v*) “Jaroslav Sestak” 2021 Travel Grant for Best Student from Central & Eastern Europe 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, Committee for Thermal Analysis & Calorimetry of the Croatian Society of Chemical Engineers (HDKIT), University of Split (Sveuceliste u Splitu) and the Faculty of Chemistry and Technology (KTF) of the University of Split, University of Craiova (UCv), and Institute of Physical Chemistry “Ilie Murgulescu” of the Romanian Academy. We acknowledge the great support of our Sponsors: TA Instruments (Diamond Sponsor), NETZSCH (Gold Sponsor), Jasika d.o.o. (Bronze Sponsor) and Labtim (Exclusive Sponsor). A special acknowledgement has to be addressed to the *Journal of Thermal Analysis and Calorimetry*, *Ceramics International*, *Surfaces and Interfaces*, where one of their volumes will be dedicated to research papers of our conference, presented as oral or poster contributions.

The 5-day meeting is hosted at the Faculty of Chemistry and Technology of the University of Split. The official language of the conference is English.

We hope that you will enjoy the city during your stay at the CEEC-TAC6 & Medicta2021 conference, and that you will leave Split 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 2023 for CEEC-TAC7 and Medicta2023!

***Matko Erceg & Andrei Rotaru***  
***Chairmen of CEEC-TAC6 & Medicta2021***



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# General Information

The joint event “6<sup>th</sup> Central and Eastern European Conference on Thermal Analysis and Calorimetry (CEEC-TAC6) & 15<sup>th</sup> Mediterranean Conference on Calorimetry and Thermal Analysis (Medicta2021)” has gathered **180 registered participants** from **25 countries**, presenting a total number of **176 scientific works**. Of those, 4 are Plenary Lectures (**PL**), 10 are Invited Lectures (**IL**), 4 Parallel Sessions of Oral Presentations – 64 contributions (**OP**) & 3 Sessions of Poster Presentation – 112 contributions (**PS**). Each session of oral presentations is comprised of 16 works, while two poster presentations include 37 works and one includes 38 works.

## Plenary Lectures

- **Daniele Cangialosi** (CSIC-Consejo Superior de Investigaciones Cientificas, Spain)
- **Herbert Danninger** (Vienna University of Technology, Austria)
- **Thomas Maskow** (Helmholtz Centre for Environmental Research, Germany)
- **Nina Obradovic** (Institute of Technical Sciences of SASA, Serbia)

## Invited Lectures

- **Romana Cerc Korosec** (University of Ljubljana, Slovenia)
- **Jordi Farjas** (University of Girona, Spain)
- **Loic Favergeon** (Ecole des Mines de Saint-Etienne, France)
- **Rodica-Mariana Ion** (Valahia University of Targoviste, Romania)
- **Stanislav Kurajica** (University of Zagreb, Croatia)
- **Birgit Maaten** (Tallinn University of Technology, Estonia)
- **Timur Mukhametzyanov** (Kazan Federal University, Russian Federation)
- **Maria das Dores M. C. Ribeiro da Silva** (University of Porto, Portugal)
- **Roberta Risoluti** (Sapienza University of Rome, Italy)
- **Ludmila N. Zelenina** (Nikolaev Institute of Inorganic Chemistry, Russian Federation)

Tuesday, 20 <sup>th</sup> of July		Wednesday, 21 <sup>st</sup> of July		Thursday, 22 <sup>nd</sup> of July		Friday, 23 <sup>rd</sup> of July			
	9 <sup>00</sup> -9 <sup>30</sup>	IL01	IL02	9 <sup>00</sup> -9 <sup>30</sup>	IL05	IL06	9 <sup>00</sup> -9 <sup>30</sup>	IL07	IL08
8 <sup>30</sup> -13 <sup>30</sup>	Short Summer School on TA&C		Poster session 1 <i>Coffee break</i>		Poster session 2 <i>Coffee break</i>		Poster session 3 <i>Coffee break</i>		
	9 <sup>30</sup> -11 <sup>20</sup>	OP1.01	OP3.01	OP4.01	OP1.09	OP2.09	OP3.09	OP4.09	
	11 <sup>20</sup> -11 <sup>40</sup>	OP2.01	OP3.02	OP4.02	OP1.10	OP2.10	OP3.10	OP4.10	OP1.13
	11 <sup>40</sup> -12 <sup>00</sup>	OP1.02	OP3.03	OP4.03	OP1.11	OP2.11	OP3.11	OP4.11	OP2.13
	12 <sup>00</sup> -12 <sup>20</sup>	OP1.03	OP3.04	OP4.04	OP1.12	OP2.12	OP3.12	OP4.12	OP3.14
	12 <sup>20</sup> -12 <sup>40</sup>	OP2.04							OP3.15
	12 <sup>40</sup> -13 <sup>10</sup>	CCTAC1			CCTAC1				OP3.16
13 <sup>30</sup> -14 <sup>30</sup>	13 <sup>10</sup> -14 <sup>30</sup>	<i>Lunch</i>		13 <sup>10</sup> -14 <sup>30</sup>	<i>Lunch</i>		13 <sup>30</sup> -14 <sup>40</sup>	<i>Lunch</i>	
	14 <sup>30</sup> -14 <sup>40</sup>	CEEC-TAC6 & Medicta2021		14 <sup>30</sup> -14 <sup>40</sup>	CEEC-TAC6 & Medicta2021		14 <sup>40</sup> -14 <sup>50</sup>	CEEC-TAC7 / Medicta2023	
14 <sup>30</sup> -16 <sup>30</sup>	14 <sup>40</sup> -15 <sup>20</sup>	Thomas Maskow, PL2		14 <sup>40</sup> -15 <sup>20</sup>	Daniele Cangialosi, PL3		15 <sup>00</sup> -15 <sup>30</sup>	IL09	
	15 <sup>30</sup> -16 <sup>00</sup>	IL03		IL04					IL10
13 <sup>30</sup> -16 <sup>30</sup>	16 <sup>10</sup> -16 <sup>30</sup>	OP1.05	OP2.05	OP3.05	OP4.05				
	16 <sup>30</sup> -16 <sup>50</sup>	OP1.06	OP2.06	OP3.06	OP4.06				
	16 <sup>50</sup> -17 <sup>10</sup>	OP1.07	OP2.07	OP3.07	OP4.07				
16 <sup>30</sup> -18 <sup>30</sup>	17 <sup>10</sup> -17 <sup>30</sup>	OP1.08	OP2.08	OP3.08	OP4.08				
	17 <sup>30</sup> -17 <sup>50</sup>	<i>Coffee break</i>							
18 <sup>30</sup> -19 <sup>20</sup>	17 <sup>50</sup> -19 <sup>00</sup>	CEEC-TAC General Assembly							
	17 <sup>50</sup> -19 <sup>00</sup>	Medicta General Assembly							
19 <sup>20</sup> -20 <sup>00</sup>		Free evening							
20 <sup>00</sup> -22 <sup>30</sup>									
		1. Room A at KTF (A0-2, Level 0)		20 <sup>00</sup> -24 <sup>00</sup>		20 <sup>00</sup> -24 <sup>00</sup>		<i>Conference Dinner</i>	
		2. Room B at KTF (A0-1, Level 0)		9 <sup>00</sup> -10 <sup>30</sup>		9 <sup>00</sup> -10 <sup>30</sup>		Saturday, 24 <sup>th</sup> of July	
		3. Room C at KTF (A0-3, Level 0)		10 <sup>30</sup>		10 <sup>30</sup>		KTF Tour	
		4. Room D at KTF (A1-2, Level 1)						Closing Ceremony	
		5. Room E at FESB, next to KTF (main amphitheatre)							
		6. Coffee Break and Poster Session area at KTF							
		7. Canteen at the Student Service							
		I-7: Sveučilište u Splitu, Kemijsko-Tehnološki Fakultet, Rudera Boskovića 35, Split							
		8. Gusar Restaurant (Restoran Gusar)							
		8: Spiniška 69, Split							
		9. Split City Centre – Diocletian Palace						Old-City Tour	
<b>Program of CEEC-TAC6 &amp; Medicta2021</b> <b>20-24 July 2021</b> <b>Split, Croatia</b>									



# **Oral Presentations 1**

**Theory & Methods, Kinetics & Catalysis, Fuels & Biofuels,  
Energetics and Applied Thermal Engineering**

## **Roman Danube limes mortars - thermal characteristics and identification of production technology**

**Snežana VUČETIĆ<sup>1</sup>, Helena Hiršenberger<sup>1</sup>, John Milan VAN DER BERGH<sup>1</sup>,  
Jonjaua RANOGAJEC<sup>1</sup>**

University of Novi Sad, Faculty of Technology, Laboratory for Materials in Cultural Heritage,  
Bulevar cara Lazara 1, 21000 Novi Sad, Serbia

Modern conservation science requires a holistic multidisciplinary research approach to reveal traditional technologies used for production of historical building materials which are a prerequisite for a practical sustainable conservation of the structures. Our research contributes to understanding of building materials and technology used in Roman times on the territory that is today Serbia.

The main research task was to design compatible mortars for future conservation works. In order to achieve that first, the mortar samples were collected from different sites located on the Roman Danube limes (period 1<sup>st</sup>-4<sup>th</sup> century). Then the comprehensive laboratory investigation followed and physical properties, thermal characterization, raw material compositions, mineralogical and microstructural properties were determined. Several different methods were used: chemical analysis, XRF and XRD for identification of the major crystalline phases and binder/aggregate ratio; FTIR analysis for detailed evaluation of the organic and inorganic components and TGA/DSC for identification of CO<sub>2</sub>/H<sub>2</sub>O ratio and index of hydraulicity.

The results obtained indicate vast diversity among the examined mortar samples and their properties considering density, binder/aggregate ratio, usage of pozzolans and consequently index of hydraulicity. These results assisted the research team to identify the traditional production technologies of the examined Roman mortar samples and enable responsible conservation approach to the selected objects. Moreover, the information about mortar samples and production technologies enhances scientific understanding of the local communities who lived on the Danube limes in nowadays Serbia centuries ago, as well as their everyday lives and technological progress.

**Key words:** Roman mortars, production technology, index of hydraulicity, conservation approach

**Acknowledgement:** The authors are grateful for the support of The Science Fund of the Republic of Serbia, PROMIS project, MoDeCo2000 [project number: 6067004].

## List of participants at CEEC-TAC6 & Medicta2021

<i>No</i>	<i>Name</i>	<i>Country</i>
1	Ackar, Petra	Croatia
2	Babic, Marko	Croatia
3	Badita, Vasilica-Loredana	Romania
4	Badita, Victor-Augustin	Romania
5	Balasko, Tilen	Slovenia
6	Baltakys, Kestutis	Lithuania
7	Barbir, Damir	Croatia
8	Bartak, Jaroslav	Czech Republic
9	Bednarska, Dalia	Poland
10	Berezicka, Anna	Poland
11	Birgauanu, Iuliana	Romania
12	Blazic, Roko	Croatia
13	Bojan, Eleonora Mihaela	Romania
14	Borko, Valentina	Croatia
15	Brusac, Edvin	Croatia
16	Cangialosi, Daniele	Spain
17	Carabet, Carla Alice	Romania
18	Cardinale, Anna Maria	Italy
19	Catauro, Michelina	Italy
20	Celan Korosin, Natasa	Slovenia
21	Cerc Korosec, Romana	Slovenia
22	Chavhan, Madhav	Czech Republic
23	Chromcikova, Maria	Slovakia
24	Coletti, Marco	Italy
25	Curkovic, Lidija	Croatia
26	Dal Poggetto, Giovanni	Italy
27	Dambrauskas, Tadas	Lithuania
28	Danilova-Tretiak, Svetlana	Belarus
29	Danninger, Herbert	Austria
30	Davalos, Juan Z	Spain
31	Davies, Philip	United Kingdom
32	Dimowa, Louiza	Bulgaria
33	Dobrinescu, Claudiu	Romania
34	Dominko, Damir	Croatia
35	Einsiedler, Gorazd	Slovenia
36	Eisinas, Anatolijus	Lithuania
37	Ekawa, Bruno	Brazil
38	Erceg, Matko	Croatia
39	Faraguna, Fabio	Croatia
40	Farjas, Jordi	Spain
41	Favergeon, Loic	France
42	Fojt, Jakub	Czech Republic
43	Fortunato, Marco	Italy
44	Freitas, Vera LS	Portugal
45	Gotovusa, Mia	Croatia
46	Harabor, Ana	Romania
47	Hrepic, Antea	Croatia
48	Hruska, Branislav	Slovakia
49	Ion, Rodica-Mariana	Romania
50	Ivkovic, Ivana Katarina	Croatia
51	Jakic, Jelena	Croatia
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