



**17<sup>th</sup> INTERNATIONAL CONGRESS  
ON THERMAL ANALYSIS AND CALORIMETRY**

**8<sup>th</sup> JOINT CZECH-HUNGARIAN-POLISH-SLOVAKIAN  
THERMOANALYTICAL CONFERENCE**

**14<sup>th</sup> CONFERENCE ON CALORIMETRY AND THERMAL ANALYSIS  
OF THE POLISH SOCIETY OF CALORIMETRY AND THERMAL ANALYSIS**

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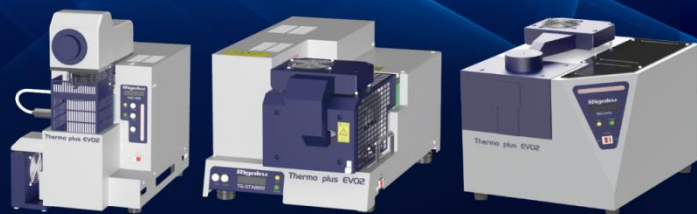


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## PREFACE

On behalf of the Organizing Committee of the 17<sup>th</sup> International Congress on Thermal Analysis and Calorimetry (ICTAC2020) including 8<sup>th</sup> Joint Czech-Hungarian-Polish-Slovakian Thermoanalytical Conference and 14th Conference on Calorimetry and Thermal Analysis of the Polish Society of Calorimetry and Thermal Analysis – I would like to welcome you cordially at this on-line event.

The Congress contains seven sessions - Thermodynamics, Thermochemistry and Kinetics; Instrumentation; Inorganic Materials; Polymers and Organic Compounds; Materials Science and Energy; Life Science; V4 and CCTA conference. During the Congress Robert Mackenzie memorial lecture, and several plenary and invited lectures will be given by outstanding scientists. For young scientists, Rigaku-ICTAC Young Scientist Award has been given. An essential part of the conference is educational Workshop titled „Good laboratory practice in thermal analysis and calorimetry”.

I would like to thank the ICTAC Executive Board with the President Wim de Klerk, the Dean of the Faculty of Materials Science and Ceramics of the AGH University of Science and Technology in Krakow, prof. Jerzy Jedliński, the Dean of Faculty of Chemical Engineering and Technology at the Cracow University of Technology, Prof. Piotr Michorczyk, Presidents of thermal analysis and calorimetry societies in V4 countries, members of the Advisory Committee, as well as members of the International Scientific Committee for continuous support and advise. Deep thanks go to the members of the Organizing Committee who devoted plenty of time to make this conference a successful event. We are grateful to the City of Krakow and our sponsors for supporting the conference, and to the Editors of the “Journal of Thermal Analysis and Calorimetry” for establishing a Special Issue dedicated to the Congress.

I wish you a pleasant and productive – although remote – conference and hope that our Congress will help to develop new scientific inspirations in the broad area of thermal analysis and calorimetry.

Thank you!

Yours sincerely,

Krzysztof Pielichowski  
ICTAC2020 Chair



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## **The kinetic study of juice industry residues drying process based on TG-DTG experimental data**

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**Keywords:** juice industry residues, TG analysis, drying process, kinetic study, decomposition mechanisms

To achieve sustainable development and mitigate the climate change challenges, the use of food industry residues is an important part of the modern circular economy. The residues from the fruit juice production industry are nowadays commonly used raw materials for producing different value-added products. In order to improve the energy efficiency aspects of the industry residue treatment, generally, the drying process as the first step of the whole processing chain should be further analyzed. Regarding these facts, a comprehensive kinetic study was performed to provide the detailed mechanisms of moisture removal from the base raw material. The industrial residues from apple juice production were used for experimental isothermal TG analysis in the air atmosphere at five different temperatures. Based on experimental data, different kinetic models were applied to determine the kinetic parameters and dominant conversion functions. The obtained results of activation energy were compared with literature data and further discussion about the decomposition mechanisms was provided. The results of this research will be further used for developing the universal mathematical model of the drying process which could be applied for other similar food materials and could provide new data for the energy efficiency improvement of the food residues processing industry.

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