

*Twenty-fifth Jubilee Annual Conference*

# YUCOMAT 2024

&

*Thirteenth World Round Table Conference on Sintering*

# XIII WRTCS

# Program and Book of Abstracts

Herceg Novi, Montenegro, September 2 to 6, 2024

*endorsed by*  
**FEMS**  
FEDERATION OF EUROPEAN  
MATERIALS SOCIETIES



Thirteenth World Round Table Conference on Sintering

XIII WRTCS

International Institute for  
the Science of Sintering

**TWENTY-FIFTH JUBILEE ANNUAL CONFERENCE  
ON MATERIAL SCIENCE  
YUCOMAT 2024**

&

**THIRTEENTH WORLD ROUND TABLE CONFERENCE  
ON SINTERING  
XIII WRTCS 2024**

**Hunguest Hotel Sun Resort, Herceg Novi, Montenegro  
September 2 to 6, 2024**

**Program  
and  
Book of Abstracts**

Organised by  
Materials Research Society of Serbia  
&  
International Institute for the Science of Sintering

Endorsed by  
**Federation of European Material Societies**

CIP - Каталогизacija u publikaciji  
Narodna biblioteka Srbije, Beograd

66.017/.018(048)  
621.762.5(048)

**DRUŠTVO za istraživanje materijala Srbije (Beograd). Godišnja konferencija  
(25 ; 2024 ; Herceg Novi)**

Programme ; and The Book of Abstracts / Twenty-fifth Jubilee Annual Conference YUCOMAT 2024 & Thirteenth World Round Table Conference on Sintering XIII WRTCS 2024, Herceg Novi, Montenegro, September 2 to 6, 2024 ; organised by Materials Research Society of Serbia & International Institute for the Science of Sintering ; [editor Dragan P. Uskoković]. - Belgrade : Materials Research Society of Serbia, 2024 (Herceg Novi : Biro Konto). - XL, 169 str. : ilustr. ; 23 cm

Tiraž 220. - Bibliografija uz pojedine apstrakte. - Registar.

ISBN 978-86-919111-9-5

1. World Round Table Conference on Sintering (13 ; 2024 ; Herceg Novi)

a) Наука о материјалима -- Апстракти b) Технички материјали -- Апстракти v) Синтеровање -- Апстракти

COBISS.SR-ID 150427657

**25<sup>th</sup> JUBILEE ANNUAL CONFERENCE ON MATERIAL SCIENCE YUCOMAT 2024**

**13<sup>th</sup> WORLD ROUND TABLE CONFERENCE ON SINTERING XIII WRTCS 2024**

Herceg Novi, Montenegro, September 2 to 6, 2024

**Program and Book of Abstracts**

**Publisher:** Materials Research Society of Serbia  
Knez Mihailova 35/IV, P. O. Box 433, 11000 Belgrade, Serbia  
Phone: +381 11 2185-437; <http://www.mrs-serbia.org.rs>

**Editor:** Prof. Dr. Dragan P. Uskoković

**Technical editors:** Dr. Sonja Jovanović and Dr. Ivana Dinić

**Typesetting and prepress:** Dr. Aleksandar Dekanski

**Covers:** Front cover photo: J. Erskine-Kelli, Attribution-ShareAlike 2.0 Generic (CC BY-SA 2.0)  
Back cover photo: property of MRS Serbia

ISBN 978-86-919111-9-5

<https://doi.org/10.5281/zenodo.13303138>

**Copyright** © 2024 Materials Research Society of Serbia – MRS Serbia

MRSS is member of the  
Federation of European Materials Societies



**Printed in:** **Biro Konto**, Sutorina bb, Igalo - Herceg Novi, Montenegro  
Phones: +382-31-670123, 670025, E-mail: [bkonto@t-com.me](mailto:bkonto@t-com.me)

**Circulation:** 220 copies. The end of printing: August 2024

P.S.I.A.3

**Mechanochemical Synthesis of Ammonium-Iminodiacetato-Dithiocarbamate:  
An Environmentally Friendly Approach**

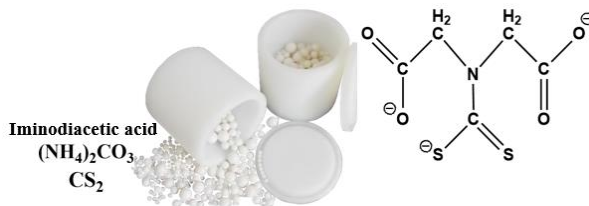
Slađana Kovačević<sup>1</sup>, Milica Kosović Perutović<sup>1</sup>, Marija Ristić<sup>2</sup>, Jana Mišurović<sup>1</sup>,  
Zorica Leka<sup>1</sup>

<sup>1</sup>University of Montenegro, Faculty of Metallurgy and Technology, Cetinjski put bb,  
81000 Podgorica, Montenegro

<sup>2</sup>University of Kragujevac, Faculty of Science, Radoja Domanovića 12, 34000 Kragujevac, Serbia

Dithiocarbamates are a group of organic compounds that have a variety of agricultural, industrial, and medical applications. Ammonium-iminodiacetato-dithiocarbamate,  $(\text{NH}_4)_3\text{idadc}$ , and its complexes with transition metals have shown fungicidal activity against the phytopathogenic fungus *Botryospheria dothidea*, which causes olive rot. Previously,  $(\text{NH}_4)_3\text{idadc}$  was prepared using a traditional method which requires the use of significant amounts of methanol [1]. In order to optimize this method (shorter duration of synthesis, increased yield, avoiding the use of solvents), mechanochemical approach, recognized as "green chemistry", was studied.

The aim of this experimental work was to achieve a dithiocarbamate derivative of iminodiacetate,  $(\text{NH}_4)_3\text{idadc}$ , through mechanochemical grinding in the planetary ball mill using zirconium oxide jars and balls. Iminodiacetate acid and ammonium-carbonate were grinded for 5 minutes, and after that  $\text{CS}_2$  was added. IR spectra of the product were recorded at different reaction times of 1, 1.5, and 2 h. After their comparison, it was concluded that the reaction is completed within 1 hour. The product was characterized by elemental analysis, IR, and UV-Vis spectroscopy, which confirmed that the desired compound was obtained. This opens broad possibilities for eco-friendly, solvent-free synthesis of dithiocarbamate compounds.



**References:**

1. Leka, Z., Leovac, V., Lukić, S., Sabo, T., Trifunović, S., & Szécsényi, K. M. J. Therm. Anal. Calorim., 83(3) (2006) 687–691. doi:10.1007/s10973-005-6938-7