

Komitet za termodinamiku i fazne dijagrame Srbije

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Montenegro, Romania, Croatia, Bosnia and Herzegovina)

JEDANAESTI SIMPOZIJUM O TERMODINAMICI I FAZNIM DIJAGRAMIMA

sa međunarodnim učešćem



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Izdavač:

Fakultet Tehničkih nauka
Kneza Miloša br.7, 38220 Kosovska
Mitrovica
Tel/Fax: (+381 28) 425-320 / 425-322
office@ftn.pr.ac.rs



Za izdavača:

Dekan,
Prof. dr Srđan Jović

Urednik:

Prof. dr Duško Minić

Kompjuterska obrada:

Doc. dr Aleksandar Đorđević

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Jedanaesti simpozijum o termodinamici i faznim dijagramima

Naučni odbor

Prof. dr D. Minić, Srbija, predsednik,
Prof. dr M. Zečević, Srbija
Prof. dr D. Manasijević, Srbija
Prof. dr Y. Du, Kina
Prof. dr G. Kaptay, Mađarska
Prof. dr J. Vreštal, Češka Republika
Prof. dr I. Katayama, Japan
Prof. dr G.P. Vassilev, Bugarska
Prof. dr J. Medved, Slovenija
Prof. dr J. Lamut, Slovenija
Prof. dr A. Udovsky, Rusija
Doc. dr T. Holjevac Grgurić, Hrvatska
Prof. dr D. Blečić, Crna Gora
Prof. dr D. Ćubela, BiH
Dr V. Ćosović, Srbija
Dr N. Talijan, Srbija
Prof. dr N. Štrbac, Srbija
Dr A. Kostov, Srbija
Dr M. Sokić, Srbija
Dr B. Marković, Srbija

Organizacioni odbor

Doc. dr. A. Đorđević, predsednik
Prof. dr D. Minić,
Prof. dr M. Zečević,
Prof. dr D. Manasijević,
Doc. dr Lj. Balanović,
dipl. inž. J. Petrović
dipl. inž. M. Mitrović

Sadržaj

	Dragan Manasijević, Duško Minić	
1.	<i>O aktivnostima Komiteta za termodinamiku i fazne dijagrame Srbije u proteklom periodu</i>	1
2.	<i>Trenutni članovi Komiteta za termodinamiku i fazne dijagrame Srbije</i>	4
3.	<i>Spisak objavljenih radova u časopisima međunarodnog značaja članova Komiteta za termodinamiku i fazne dijagrame Srbije u periodu 2021-2023. godina</i>	5

Plenarno predavanje:

1.	Vaso Manojlović, Gordana Marković <i>Designing Biocompatible Titanium Alloys: Machine Learning Approach</i>	11
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Izvodi radova:

1.	Dragan Manasijević, Ljubiša Balanović, Ivana Marković, Milan Gorgievski, Uroš Stamenković, Kristina Božinović <i>Microstructure and thermal properties of Ag–Sb alloys</i>	15
2.	Ivana Marković, Uroš Stamenković, Dragan Manasijević, Ljubiša Balanović <i>Microstructural analysis and hardness of some tin bronzes alloyed with Zn or/and Pb</i>	17
3.	Uroš Stamenković, Ivana Marković <i>The influence of solution heat treatment temperature on mechanical and structural properties of the EN AW-6060 and EN AW-6082 aluminium alloys</i>	19
4.	Avram Kovačević, Uroš Stamenković <i>Influence of cold plastic deformation performed before and after aging on hardness and microstructure of EN AW-7075 aluminum alloy</i>	21
5.	Milan Gorgievski, Miljan Marković, Nada Štrbac, Ljubiša Balanović, Dragan Manasijević, Vesna Grekulović <i>SEM-EDS and thermodynamic studies of onion peels used as a biosorbent for the adsorption of Cu²⁺ ions from synthetic solutions</i>	23
6.	Jasmina Petrović, Srba Mladenović, Ivana Marković, Uroš Stamenković, Milan Nedeljković, Milijana Mitrović <i>Analysis of the thermal properties of particle-reinforced aluminum composites</i>	26

7	Milan Nedeljković, Srba Mladenović, Milan Gorgievski, Jasmina Petrović, Avram Kovačević <i>The effect of thermal aspects and composition on the melting process in various commercial solder alloys</i>	28
8.	Ljubiša Balanović, Dragan Manasijević, Ivana Marković, Milan Gorgievski, Uroš Stamenković <i>Bi–In–Sn Lead-free solders: Microstructure and thermal conductivity</i>	30
9.	Milijana Mitrović, Saša Marjanović, Biserka Trumić, Jasmina Petrović, Milan Nedeljković <i>The influence of the obtaining procedure and thermomechanical treatment on the grain size of copper micro-alloyed with iron and phosphorus</i>	33
10.	Milijana Mitrović, Saša Marjanović, Biserka Trumić <i>The use of copper and copper alloys for making rondels</i>	37
11.	Milena Zečević, Yong Du, Aleksandar Đorđević, Duško Minić, Dejan Gurešić <i>Mechanical properties, Scheil and Lever simulation of the alloys from ternary Cu-Ge-In system</i>	39
12.	Milena Zečević, Yong Du, Duško Minić, Aleksandar Đorđević, Dragan Manasijević <i>Electrical properties, Scheil and Lever simulation of the alloys from ternary Cu-Ge-In system</i>	41
13.	Duško Minić, Yuling Liu, Milena Zečević, Aleksandar Đorđević, Dragan Manasijević <i>Microstructural and mechanical properties of the ternary Cu-Ge-Pb system</i>	43
14.	Aleksandar Đorđević, Yuling Liu, Duško Minić, Milena Zečević <i>Electrical properties of the ternary Cu-Ge-Pb system</i>	45
15.	Aleksandar Đorđević, Aleksandar Todić, Milena Premović, Duško Minić <i>Effect of chemical composition on the microstructure, hardness and electrical conductivity profiles of the Bi-Ni-Pb alloys</i>	47
16	Milena Premović, Duško Minić, Aleksandar Đorđević, Milutin Živković <i>Effect of chemical composition on the microstructure, hardness and electrical conductivity profiles of the Bi-Ni-Ge alloys</i>	49
17.	Gvozden Jovanović, Vaso Manojlović, Miroslav Sokić, Alen Delić, Milorad Gavrilovski <i>Influence of mould preheating on solidification stress of railway aluminothermic welding by casting simulation</i>	51

18.	Vaso Manojlović, Aleksandar A. Jovanović, Mladen Bugarčić, Gvozden Jovanović, Branislav Marković, Miroslav Sokić <i>Exergy analysis of steel manufacturing in the oxygen converter</i>	53
19.	Dejan Gurišić, Duško Minić, Miroslav Sokić, Suzana Samaržija-Jovanović, Aleksandar Đorđević, Milena Zecević <i>Thermodynamic and kinetic analysis of cobaltite oxidation process</i>	55
20.	Jovana Galjak, Jelena Đokić, Jasmina Dedić, Irma Dervišević, Gordana Milentijević <i>Assessment of heavy metal contamination in water and sediments of river Ibar and Leskov stream using pollution indicators</i>	57
21.	Jovana Galjak, Jelena Đokić, Zoran Golubović, Irma Dervišević, Gordana Milentijević <i>Leaching of arsenic from the Gornja Polje Mine tailings, using the TCPL method</i>	59
22.	Miljojka Mijailović, Ivan Bogavac, Miljana Krstić, Svetomir Milojević <i>Production of lozovača from Hamburg grape variety</i>	61
23.	Bojana Živković, Jelena Đokić <i>Examination of the basic physical and chemical parameters of the soil of the Savina Stena sanitary landfill</i>	63
24.	Aleksandar Todić, Milan T. Đorđević <i>Effect of vanadium on the microstructure, mechanical and electrochemical properties of carbides in chromium-molybdenum steels</i>	65
25.	Milan Kolarević, Vladan Grković, Duško Minić, Milena Premović <i>Response Surface Methodology for Mixture Experiments</i>	67
26.	Milan Kolarević, Mladen Rasinac, Duško Minić, Aleksandar Đorđević <i>RA-TeS Software for Response Surface Methodology of the Mixture Experiments</i>	69
27.	Jelena Đokić, Jovana Galjak, Aleksandar Đorđević, Zoran Golubović, Jasmina Dedić <i>Characterization of the mixed heterogeneous metallurgical waste</i>	71
28.	Milutin Živković, Milan Stanojević, Predrag Dašić, Milan Milosavljević <i>Analysis of influential parameters on improving the operating characteristics of hydraulic system devices</i>	73

Exergy analysis of steel manufacturing in the oxygen converter

**Vaso Manojlović¹, Aleksandar A. Jovanović², Mladen Bugarčić²,
Gvozden Jovanović², Branislav Marković², Miroslav Sokić²**

¹*University of Belgrade, Faculty of Technology and Metallurgy, Belgrade, Serbia*
²*Institute for Technology of Nuclear and Other Mineral Raw Material, Belgrade, Serbia*

Abstract

In oxygen converters, molten iron from the blast furnace is refined with steel waste under oxidizing conditions [1]. The injected oxygen passes into the iron melt, after which it reacts with the impurities. Analysis of exergy losses clearly indicates the place of energy losses in the observed process, so a detailed analysis can influence the improvement of a complex process [2]. Exergy losses occur due to technological imperfections such as heat dissipation or friction and system irreversibility according to the second law of thermodynamics [3]. The concept of exergy can be used for a better understanding of the feasibility of a process, as well as for the techno-economic analysis of the process at different variations of input/operating parameters. In this work thoughtful calculation of exergy oxygen converter was done. According to the obtained data, out of a total of 972.2 MJ of thermal energy, which is released by exothermic reactions in the refining process, 817.5 MJ is pure exergy and can be used, the rest is energy that arises due to irreversibility.

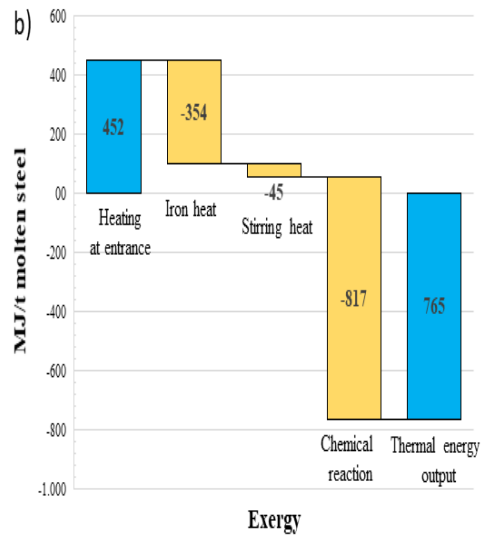
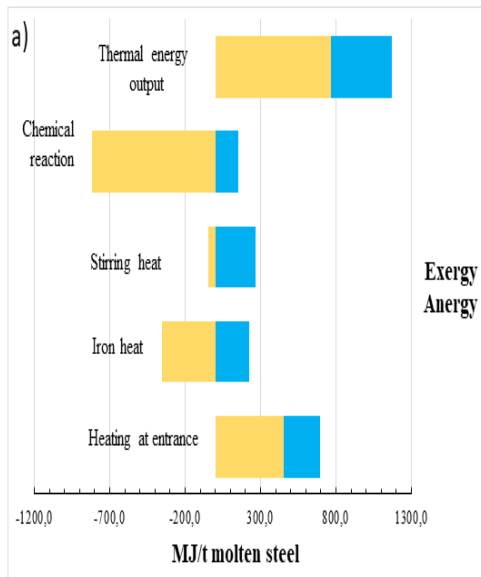
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Graphical abstract:



a) Irreversible losses in the process and
 b) Exergy balance of the oxygen converter.



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