

UNIVERSITY OF BELGRADE
TECHNICAL FACULTY IN BOR



BOOK OF ABSTRACTS

8th INTERNATIONAL STUDENT
CONFERENCE ON TECHNICAL
SCIENCES



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8th INTERNATIONAL
STUDENT CONFERENCE
on Technical Sciences

20-21 October,
Bor Lake, Serbia



Editor: Uroš Stamenković

Book of Abstracts,

8th International Student Conference on Technical Sciences ISC 2023

Editor:

Doc. dr Uroš Stamenković

University of Belgrade - Technical Faculty in Bor

Technical Editors:

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University of Belgrade - Technical Faculty in Bor

Publisher: *University of Belgrade - Technical Faculty in Bor*

For the publisher: *Dean, Prof. dr Dejan Tanikić*

Circulation: 50 copies

Year of publication: 2023

Printed by "GRAFIKA GALEB DOO" NIŠ, 2023

ISBN 978-86-6305-141-6

CIP - Каталогизacija у публикацији Народна библиотека Србије, Београд

622(048)

669(048)

66(048)

66.017/.018(048)

INTERNATIONAL Student Conference on Technical Sciences (8 ; 2023 ;
Borsko jezero)

Book of abstracts / 8th International Student Conference on Technical
Sciences ISC 2023, 20-21 October, Bor Lake, Serbia ; [organized by University
of Belgrade, Technical Faculty in Bor] ; editor Uroš Stamenković. - Bor :
University of Belgrade, Technical Faculty, 2023 (Niš : Grafika Galeb). - VII, 51
str. ; 24 cm

Tiraž 50. - Bibliografija uz većinu apstrakata.

ISBN 978-86-6305-141-6

a) Рударство -- Апстракти b) Металургија -- Апстракти v) Хемијска
технологија -- Апстракти g) Технички материјали -- Апстракти

COBISS.SR-ID 126594825

**8th International Student Conference on Technical Science,
ISC 2023.**

Is organized by

UNIVERSITY OF BELGRADE, TECHNICAL FACULTY IN BOR

and co-organized by

**University of Zenica, Faculty of engineering and natural sciences,
Zenica, Bosnia and Herzegovina**

**University in Priština, Faculty of Technical Science, Kosovska
Mitrovica,
Serbia;**

**University of Montenegro, Faculty of Metallurgy and Technology,
Podgorica, Montenegro;**

**University of Tuzla, Faculty of Technology, Tuzla, Bosnia and
Herzegovina;**

**University of Chemical Technology and Metallurgy, Faculty of
Metallurgy and Material Science, Sofia, Bulgaria;**

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EFFECT OF THE AUSTENITIZING TEMPERATURE ON THE PROPERTIES OF 51CrV4 SPRING STEEL

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Abstract

Choosing the correct temperature and duration for the austenitization process is crucial to attaining a consistent, singular-phase state of austenite with evenly dispersed alloying elements. It's important to prevent excessive growth of austenite crystal grains, which could detrimentally impact the mechanical characteristics of the steel. In this paper, the effect of the austenitizing temperature on the properties of 51CrV4 spring steel was investigated. Samples were heated at various austenitizing temperatures (770°C, 800°C, 830°C, 860°C, 890°C, and 920°C) and cooled in still air. The mechanical properties were investigated by measuring hardness and calculating tensile strength. The microstructures of the samples were characterized using optical microscopy. The increase in austenitizing temperature leads to an increment in hardness and tensile strength values. Maximum values of mechanical properties were achieved after austenitizing at 860°C for 30 minutes. In all investigated samples, a ferrite-pearlite microstructure was observed. Three characteristic samples that had the lowest, highest, and optimal austenitizing temperatures were investigated by optical microscopy. The microstructures of the three investigated samples were compared, and the results show that as the austenitizing temperature increases, the grain size decreases continuously.

Keywords: *51CrV4, Austenitizing temperature, Spring steel, Heat treatment, Normalization*

ACKNOWLEDGEMENT

The research presented in this paper was done with the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, within the funding of the scientific research work at the University of Belgrade, Technical Faculty in Bor, according to the contract with registration number 451-03-47/2023-01/200131.

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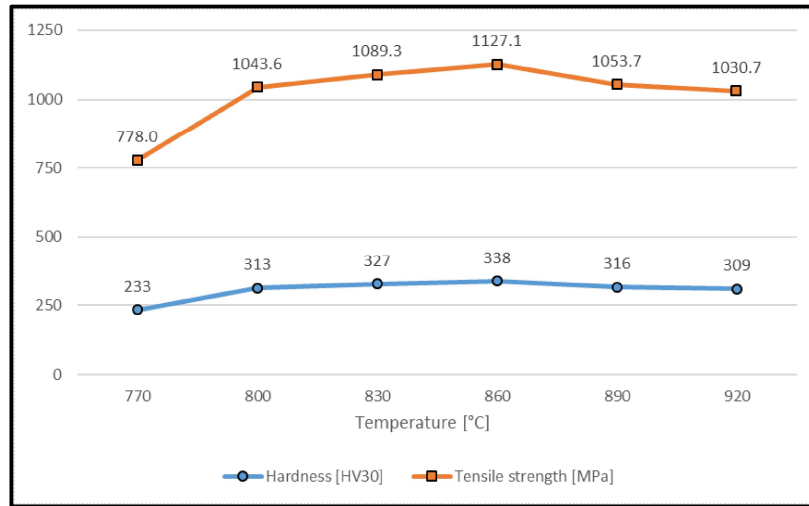


Figure 1 - The mechanical properties of the investigated samples as a function of austenitizing temperature

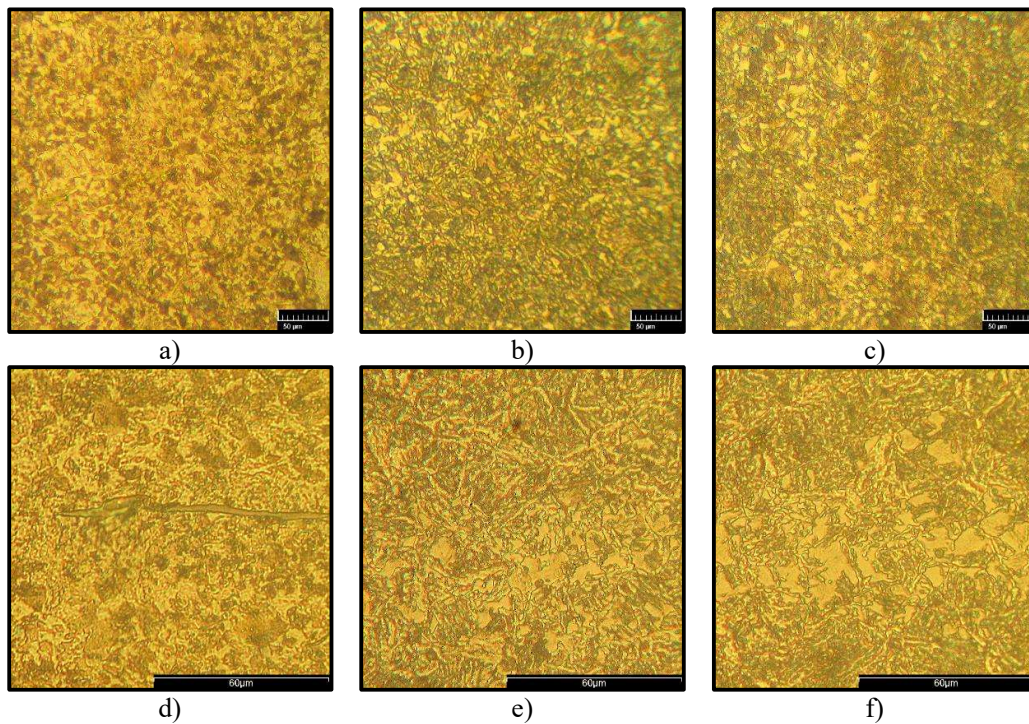


Figure 2 - Microstructures of the investigated samples as a function of austenitizing temperature at different magnifications: a) 770°C (x500); b) 860°C (x500); c) 920°C (x500); d) 770°C (x1000); e) 860°C (x1000); f) 920°C (x1000)



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*20-21 October, Bor Lake,
Serbia*

ISBN 978-86-6305-141-6