Komitet za termodinamiku i fazne dijagrame Srbije

u saradnji sa:

Fakultetom tehničkih nauka u Kosovskoj Mitrovici,
Tehničkim fakultetom u Boru i
Associated Phase Diagram and Thermodynamics Committee
(Poland, Czech Republic, Hungary, Bulgaria, Slovenia, Serbia, Montenegro, Romania, Croatia, Bosnia and Herzegovina)

DVANAESTI SIMPOZIJUM O TERMODINAMICI I FAZNIM DIJAGRAMIMA

sa međunarodnim učešćem

ZBORNIK IZVODA RADOVA

Kosovska Mitrovica,
20-21. jun 2025. god.

Dvanaesti simpozijum o termodinamici i faznim dijagramima

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

Za izdavača:
Dekan,
Prof. dr Jordan Radosavljević

Urednik:
Prof. dr Duško Minić

Kompjuterska obrada:
Doc. dr Aleksandar Đorđević
Prof. dr Milena Zečević

Godina izdavanja:
2025

Tiraž: 100 primeraka
ISBN: 978-86-81656-84-6

Štampa: Grafit Raška

Na osnovu člana 55. stav. 1. tačke 8. i 38. Statuta Fakulteta tehničkih nauka u Kosovskoj Mitrovici, Nastavno-naučno veće na svojoj sednici održanoj dana 22.01.2025. godine, donelo je ODLUKU br. 44/3-10 o organizovanju naučnog skupa u 2025. godini, pod naslovom: „Dvanaesti simpozijum o termodinamici i faznim dijagramima“.

The influence of vanadium on the microstructure and electrochemical properties of carbides in chromium-molybdenum steels

Aleksandar Todić[1a], Milan T. Đorđević[1b], Dušan Arsić[2a], Aleksandar Đorđević[1c]

[1] *Faculty of Technical Sciences, University of Priština, Knjaza Miloša 7, 38220, Kosovska Mitrovica, Serbia*
[2] *Faculty of Engineering, University of Kragujevac, Sestre Janjić 6, 34000 Kragujevac, Serbia*

1[a] aleksandar.todic@pr.ac.rs, 0000-0003-3308-5226
1[b] milan.t.djordjevic@pr.ac.rs, 0000-0001-7317-8334
2[a] dusan.arsic@fink.rs, 0000-0003-0326-0898
1[c] aleksandar.djordjevic@pr.ac.rs, 0000-0002-2020-6976

Abstract

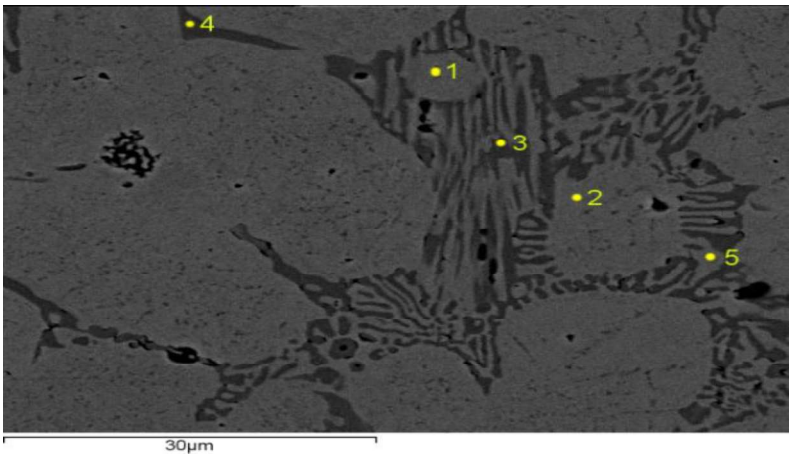
Besides the modern non-metallic materials, which can successfully replace metallic materials in certain fields, steel materials are still largely present in technical practice. That trend will remain for many years to come. That is why there is a need to develop new types of steel, that possess better properties, in addition to the existing ones. The Cr-Mo steels, with a high vanadium content, belong to a group of the newer steels, with relatively high values of hardness and toughness. The X180CrMo12-1 steel, with varying percentages of vanadium, within the limits of 0.5-3 %, was used for the tests in this work. Vanadium, as a carbide-forming alloying element, creates a carbide network of the M_7C_3 type around the metal substrate, and finely dispersed carbides of the V_6C_5 type within the metal substrate. For the conducted research, modern equipment was used for analysis of the chemical composition, monitoring of the shape of metal grains and carbide network, as well as for electrochemical characterization. In the conducted research, the objective was to determine the carbide composition, microstructure, and morphology and to evaluate their impact on the material's characteristics. The steel samples were experimentally examined using scanning electron microscopy with energy dispersive spectrometry (SEM-EDS) and Xray diffractometric analysis (XRD). The carbide composition analysis has confirmed that this actually was the M_7C_3 carbide, as it was earlier assumed.

Type of work: original research paper.

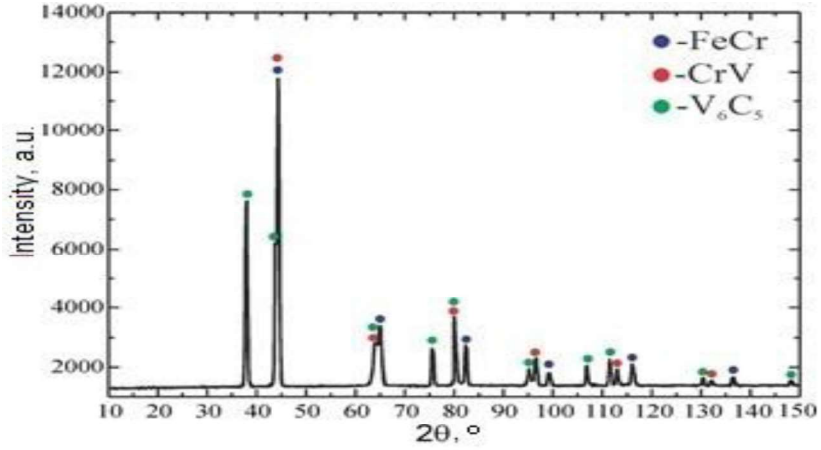
References

1. Y. Lin, C-C. Lin, T.-H. Tsai, H.-J. Lai, Materials and Manufacturing Processes, 25(4) (2010), 246-248.
2. C. Capdevila, C. Garcia-Mateo, J. Chao, F.G. Caballero, Materials Science and Technology, 25(11) (2009), 1383-1386.

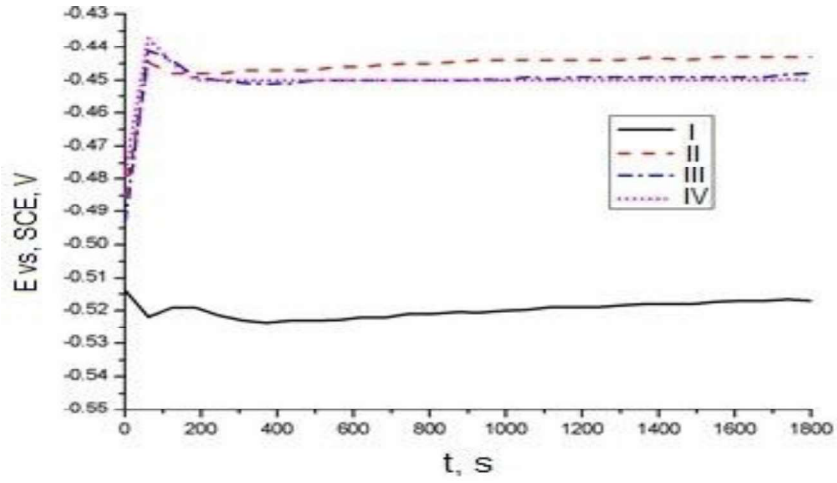
Graphical abstract:



Microstructure of alloy semple I.



Diffractogram for tested sample IV .



Open circuit potential for samples I, II, III, IV in 0,1 M H_2SO_4.

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

669.017(048)
536.7(048)

СИМПОЗИЈУМ о термодинамици и фазним дијаграмима (12 ; 2025 ; Косовска Митровица)
Zbornik izvoda radova / Dvanaesti simpozijum o termodinamici i faznim dijagramima sa međunarodnim učešćem, Kosovska Mitrovica, 20-21. jun 2025. god. ; [organizator] Komitet za termodinamiku i fazne dijagrame Srbije ... [et al.] ; [urednik Duško Minić]. - Kosovska Mitrovica : Fakultet tehničkih nauka, 2025 (Raška : Grafit). - 74 str. : ilustr. ; 25 cm

Tiraž 100.

ISBN 978-86-81656-84-6

a) Физичка металургија -- Апстракти b) Термодинамика -- Апстракти

COBISS.SR-ID 170393353