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

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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“.

Simpozijum je finansijski podržan od strane Ministrastva nauke, tehnološkog razvoja i inovacija Republike Srbije

Dvanaesti simpozijum o termodinamici i faznim dijagramima

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Sadržaj

Plenarno predavanje:

Izvodi radova:

Microstructural and thermal properties of the Al-Cu eutectic alloy

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Abstract

Understanding thermal characteristics such as thermal conductivity, specific heat capacity, and latent heat of fusion is crucial when developing phase change materials (PCMs) for latent heat energy storage (LHES) systems [1]. Among metal-based PCMs, aluminum-based eutectic alloys have emerged as some of the most extensively studied due to their favorable thermal and mechanical properties [2].In this study, the Al–33.6 mass% Cu eutectic alloy was investigated in terms of its microstructure, thermal diffusivity, thermal conductivity, specific heat, and latent heat of melting. Techniques including scanning electron microscopy (SEM), energy-dispersive spectroscopy (EDS), differential scanning calorimetry (DSC), and the light flash method were employed. Analysis revealed that the alloy's microstructure contains both fine and coarse (Al)+Al_2Cu eutectic phases. Measurements showed that specific heat, thermal diffusivity, and thermal conductivity all increase with temperature over the range of 25–400 °C. At room temperature, the alloy exhibits a thermal conductivity of 134.3 $W \cdot m^{-1} \cdot K^{-1}$. The latent heat of fusion was determined to be 319.5 $J \cdot g^{-1}$. Overall, the findings highlight the strong potential of the Al–Cu eutectic alloy as a candidate material for use in phase change thermal energy storage applications.

Type of work: original research paper.

Acknowledgement

The research presented in this paper was done with the financial support of the Ministry of Science, Technological Development and Innovations of the Republic of Serbia, with the funding of the scientific research work at the University of Belgrade, Technical Faculty in Bor, according to the contract with number 451-03-137/2025-03/ 200131.

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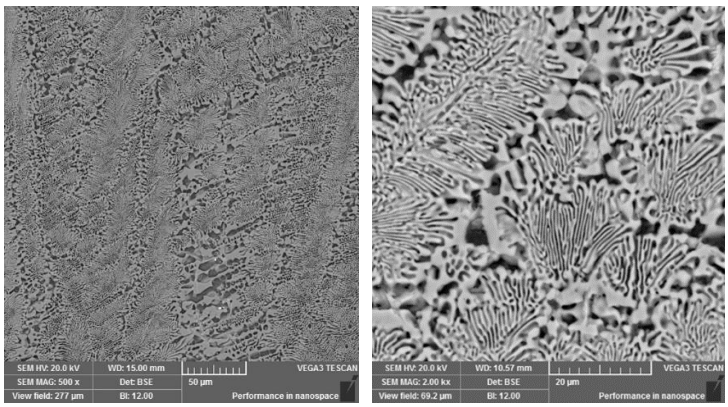
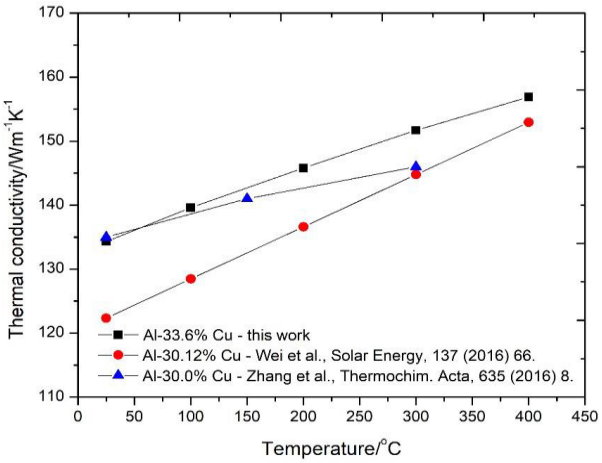
2. Z. Wang, H. Wang, X. Li, D. Wang, Q. Zhang, G. Chen, Z. Ren, Applied Thermal Engineering. 89 (2015) 204-208.

Graphical abstract:



(a) *(b)*

SEM image of the Al-33.6% Cu eutectic alloy: (a) magnification 500x; (b) magnification 2000x.



Thermal conductivity dependence on temperature for the investigated Al-33.6% Cu alloy with the literature data.