

**MODELOVANJE TERMODINAMIČKIH SVOJSTAVA
DVOKOMPONENTNE SMEŠE CITRALA I ETANOLA
U INTERVALU TEMPERATURE (288,15–323,15) K
I NA ATMOSFERSKOM PRITISKU KORIŠĆENJEM
HERIC-BREWER-JOUYBAN-ACREE
TROPARAMETARSKOG MODELA**

**MODELING OF THERMODYNAMIC PROPERTIES OF BINARY MIXTURE
OF CITRAL AND ETHANOL IN THE TEMPERATURE RANGE (288.15–323.15) K
AND AT ATMOSPHERIC PRESSURE USING THE
HERIC-BREWER-JOUYBAN-ACREE THREE PARAMETER MODEL**

Nikola Grozdanić^{*1}, Zoran Simić², Mirjana Kijevčanin¹, Ivona Radović¹,

¹Univerzitet u Beogradu, Tehnološko Metalurški Fakultet, Beograd

²Univerzitet u Beogradu, Inovacioni centar
Tehnološko-metalurškog fakulteta, Beograd

Termodinamička i transportna svojstva čistih terpena i njihovih binarnih smeša sa različitim organskim rastvaračima igraju važnu ulogu u procesima ekstrakcije iz biljnog materijala. Razvijeno je mnogo modela koji omogućavaju proračun termodinamičkih svojstava na određenoj temperaturi, pritisku i sastavu. U ovom radu eksperimentalno izmerene termodinamičke osobine kao što su gustina, viskozitet, indeks prelamanja i brzina zvuka binarne smeše citrala sa etanolom u temperaturnom opsegu $T = (288,15–323,15)$ K i pri atmosferskom pritisku su korelisane sa Heric-Brewer-Jouyban-Acree troparametarskim modelom.

Primenljivost modela je predstavljena sa prosečnim procentualnim odstupanjem manjim od 0,05% za gustinu i indeks prelamanja, manjim od 0,9% za viskozitet i manjim od 0,5% za brzinu zvuka. Dobijeni rezultati su pokazali da je Heric-Brewer-Jouyban-Acree model pogodan za korelaciju svih eksperimentalnih termodinamičkih svojstava sa maksimalnim prosečnim procentualnim odstupanjem manjim od 1%.

Ključne reči: terpene; smeša; gustina; viskoznost; Heric-Brewer-Jouyban-Acree model

Thermodynamic and transport properties of pure terpenes and their binary mixtures with different organic solvents plays an important role for the extraction processes from plant material. Many models have been developed which enable the calculation of thermodynamic properties at the required temperature, pressure and composition. In this work the experimentally measured thermodynamic properties such as density, viscosity, refractive indexes and speed of sound of a binary mixture of citral with ethanol at temperature range $T = (288.15–323.15)$ K and at atmospheric pressure were correlated with the Heric-Brewer-Jouyban-Acree three parameter model.

* Corresponding author: ngrozdanic@tmf.bg.ac.rs
<https://orcid.org/0000-0003-2412-4000>

Zoran Simić: <https://orcid.org/0000-0001-8258-5492>
Mirjana Kijevčanin: <https://orcid.org/0000-0001-7126-3965>
Ivona Radović: <https://orcid.org/0000-0002-2726-1564>

The applicability of the model was represented with the average percent deviation of less than 0.05% for density and refractive index, less than 0.9% for viscosity and less than 0.5% for speed of sound. The obtained results showed that a Heric-Brewer-Jouyban-Acree model is suitable to correlate all the experimental thermodynamic properties with maximum average percent deviation less than 1%.

Key words: *terpenes; mixture; density; viscosity; Heric-Brewer-Jouyban-Acree model*