

# Thermodynamic Properties of Eutectic Silumins Doped by Transition Metals

D. S. Kanibolotsky<sup>a,b</sup>, V. A. Stukalo<sup>a</sup>, and V. V. Lisnyak<sup>a</sup>

<sup>a</sup> Chemical Department of Kiev National Taras Shevchenko University, Vladimirskaya Street 64, Kiev 01033, Ukraine

<sup>b</sup> Biophysical Department, Academician Peter Bogach Institute, Glushkova Ave. 2, corpus 12, Kiev 03022, Ukraine

Reprint requests to Drs. V. V. L. and D. S. K.; Fax: +38-(0)44-2302505,  
E-mail: lisnyak@chem.univ.kiev.ua

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The thermodynamic properties of the liquid silumins  $(\text{Al}_{0.879}\text{Si}_{0.121})_{1-x}\text{Tr}_x$ , where  $\text{Tr} = \text{Cu}, \text{Fe}, \text{Ni}$  and  $\text{Ti}$ , have been measured, using the electromotive force method at 1040 K. It has been found that diluted solutions of Fe or Ni in eutectic silumins at Tr molar fractions of  $0 < x_{\text{Fe}} \leq 0.035$  and  $0 < x_{\text{Ni}} \leq 0.027$  are characterized by positive deviations from ideality for aluminium. However, the deviations become negative at increasing of the Tr concentration. However, molten silumins doped by Ti and Cu show negative deviations from Raoult's law for aluminium at the studied concentrations. Thermodynamic activity of Al in the silumins decreases in the sequence of  $\text{Fe} \rightarrow \text{Ni} \rightarrow \text{Cu} \rightarrow \text{Ti}$  for the dopants.

*Key words:* Silumins; Al–Si–(Cu, Fe, Ni, Ti); Liquid Alloys; Electromotive Force Method; Thermodynamic Activity; Gibbs Energy.