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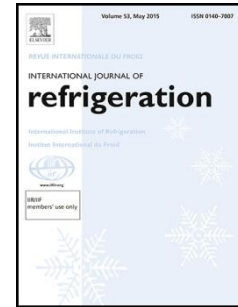
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Surface tension of HFC-161 and compressor oil mixtures

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Highlights:

- The reliability of the experimental setup was checked by measuring the surface tension of HC-600a.
- The surface tension of mixtures of HFC-161 and three kinds of compressor oil were obtained, and correlations were given. a brief comparison with pure HFC-161 was made.
- A brief comparison of mixtures with pure refrigerant HFC-161 were made, also the variation tendency were summarized.

ABSTRACT

The surface tension of environmental-protection refrigerant ethyl fluoride(HFC-161) and its mixtures with commercial lubricant RL68H, SUNISO SL-32S and SUNISO 3GS were determined in the temperature range from (242 to 370)K by differential capillary rise method. The mass fraction of oil in mixtures is below 2.0%. All the surface tensions of mixtures were correlated as a function of temperature and mass fractions, which can be easy to apply to relevant refrigeration design. Before that, the experimental apparatus was verified by measuring the surface tension of HC-600a. The temperature and surface tension uncertainty were within 12mK, $0.2\text{mN}\cdot\text{m}^{-1}$, respectively.

Key words: Surface tension, HFC-161, Lubricant oil, Differential capillary rise method

List of symbols

σ	Surface tension ($\text{mN}\cdot\text{m}^{-1}$)
σ_{exp}	Experimental surface tension data ($\text{mN}\cdot\text{m}^{-1}$)
σ_{fit}	Fitted surface tension data ($\text{mN}\cdot\text{m}^{-1}$)
σ_{ref}	Surface tension of references ($\text{mN}\cdot\text{m}^{-1}$)
$\rho_{\text{mix},l}$	Liquid density of refrigerant and oil mixture ($\text{kg}\cdot\text{m}^{-3}$)
ρ_o	Liquid density of oil ($\text{kg}\cdot\text{m}^{-3}$)
ρ_l	Liquid density of refrigerant ($\text{kg}\cdot\text{m}^{-3}$)
ρ_g	vapor density ($\text{kg}\cdot\text{m}^{-3}$)

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