

# Method for calculation of thermal conductivity of hydrofluorochloroolefin isomers on the saturation line

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The problem of predicting the thermal conductivity of liquid cis-isomers and trans-isomers of hydrochlorofluoroolefins on the coexistence curve is considered. The approach is based on linear correlation [1]:

$$\lambda_s^{(1)} = \lambda_0^{(1)}(a_1 + b_1 T_{rb}^{(1)}), \quad (1)$$

where  $a_1$ ,  $b_1$  are constant coefficients,  $T_{rb}^{(1)} = T/T_b^{(1)}$ ;  $T_b$  is the normal boiling point, K;  $\lambda_0^{(1)} = p_c^{2/3} M^{-1/2} T_c^{-1/7} G u^{-4} + 0.05\omega^4$ ;  $p_c$  and  $T_c$  are the critical pressure and the critical temperature;  $M$  is the molar mass,  $G u = T_c/T_b$ ,  $\omega$  is the acentric factor.

If  $\lambda_s^{(2)}$  of the cis-isomer is described by (1), then  $\lambda_s^{(1)}$  of the trans-isomer is calculated by the formula:

$$\lambda_s^{(2)} = \lambda_0^{(1)}(a_1 \Gamma^\alpha + b_1 T_{rb}^{(2)}), \quad (2)$$

where  $\Gamma = T_b^{(2)}/T_b^{(1)}$ ;  $T_{rb}^{(2)} = T/T_b^{(2)}$ ;  $T_b^{(1)}$ ,  $\lambda_b^{(1)}$  and  $T_b^{(2)}$ ,  $\lambda_0^{(2)}$  are the characteristics of the trans-isomer and cis-isomer, respectively;  $\alpha = 0.15$ .

The procedure was tested on the example of cis-isomers R1234ze(Z), R1336mzz(Z) and trans-isomers R1234ze(E), R1336mzz(E). Based on this method,  $\lambda_s$  of the cis-isomer R1132(Z) was predicted. This method was compared with known correlation models [1–3].

- [1] Rykov S V, Kudryavtseva I V and Rykov V A 2022 *Journal of International Academy of Refrigeration* **2** 70–76
- [2] Yang S, Tian J and Jiang H 2020 *Fluid Phase Equilib.* **509** 112459
- [3] Kudryavtseva I V and Rykov S V 2022 *Russ. J. Phys. Chem. A* **96** 2098–2104