High-pressure viscosity behavior of x 1,1,1,2-tetrafluoroethane (HFC-134a)+(1-x) triethylene glycol dimethylether (TriEGDME) mixtures: Measurements and modeling

In this work new dynamic viscosity measurements for binary mixtures containing a refrigerant (HFC-134a, CF3CH2F) and a lubricant (TriEGDME, CH3O(CH2OCH2)(3)CH3) are reported. The measurements were carried out at temperatures between 293.15 and 373.15 K and pressures from 10 to 100 MPa, for two mole fractions x(HFC) = 0.3427 and 0.5940 (a total of 100 experimental values). Since lubricants and refrigerants are in two different thermodynamic states at atmospheric pressure and ambient temperature, an especially designed falling-body viscometer has been used to perform the measurements. The data obtained for this binary system have been used to test the ability of several viscosity models having different origins and theoretical backgrounds. The considered models range from simple mixing rules, through empirical correlations, such as the self-referencing model and the LBC model, to recent approaches with a physical and theoretical background, such as the hard-sphere scheme, the free-volume model, and the friction theory.

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