Helmholtz Energy Equations of State for the Thermodynamic Properties of *n*-Hexene and *n*-Heptene

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n-Hexene and *n*-heptene are significant industrial linear alpha olefins, so they can be used as co-monomers for producing polyethylene. In order to widely apply *n*-hexene and *n*-heptene in industry, such as chemical simulation and process optimization, and thermophysics properties research, their equations of state were developed based on comprehensive collection of the available experimental thermodynamic property data from the literature. Those data were critically assessed according to internal consistency in this work and most of data sets agree well with each other. Their equations model is explicit in Helmholtz energy with in dependent variables of density and temperature, which includes two parts, one for describing the ideal-gas properties and another for describing the residual properties of real fluids from the influence of intermolecular forces. For *n*-hexene, the equation of state is valid from the triple-point temperature, 133 K, to 570 K, with pressures up to 254 MPa and densities up to 13 mol·dm^{-3}. The uncertainties are 0.2 % for the liquid density, 0.5 % for the supercritical density, 0.3 % for the vapor pressure, 0.2 % for the saturated liquid density, 2 % for the liquid-phase isobaric heat capacity and 1 % for the liquid-phase sound speed. For *n*-heptene, the equation of state is valid from the triple-point temperature, 154 K, to 570 K, with pressures up to 254 MPa and densities up to 12 mol·dm^{-3}. The uncertainties in density of the equation of state range from 0.2 % in the liquid phase to 1 % near the critical region. The uncertainties are 0.2 % for the vapor pressure, 0.2 % for the saturated liquid density and 3 % for the isobaric heat capacity. In the critical region, the uncertainties are higher for all properties. Furthermore, the behavior of both equations of state is assessed and reasonable within the region of validity and at higher and lower temperatures and pressures.