

Entropy Scaling Applied to the Shear Viscosity of Propane and Other Normal Alkanes

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Entropy scaling, with its basis in isomorph theory, links scaled transport properties (viscosity, thermal conductivity, and diffusivity) to the residual (or excess) entropy, a thermodynamic property. This presentation focuses on the application of entropy scaling to the shear viscosity of normal alkanes. The focus is in two primary areas: 1) the viscosity of propane, where it is shown that a very simple correlation dependent on the residual entropy can be used to obtain highly accurate transport property models, approaching the deviations of the reference correlations 2) the viscosity of the normal alkane family, in which the residual entropy framework helps to understand what is (and is not) anomalous about the viscosity of the normal alkanes. A generalized scheme applied to the entropy scaling of the normal alkanes helps to identify deficiencies in the pure fluid equation of state for normal alkanes.