A New Thermal Conductivity Calculation Model for Liquid n-Alkanes

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The thermal conductivity is an important transport property for fluids. It is required in many engineering applications including transportation, storage, and combustion. Since experimental thermal conductivity data have not been reported yet for some n-alkanes, its prediction model of the thermal conductivity is of great necessity. In general, rigorous theoretical and semi-theoretical methods show poor accuracy. Empirical models, however, are more practical. In this work, a modified thermal conductivity empirical equation based on Latini's work [1] was proposed. The present equation was used to calculate the thermal conductivity model of 10 n-alkane (from methane to n-decane) in the liquid phase. A comparison between the calculated data and literature values was performed and the average absolute deviation is 0.05 %.

References:

[1] Latini G, Nicola G D, Pierantozzi M. Liquid thermal conductivity prediction for alkanes, ketones and silanes. *Phys.Chem.Liq*, 2017,1-19.