

Surface Tension of Biodiesel-Measurement and Theoretical Calculation

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In recent years, against the background of energy shortage and with the aim of environmental protection, the search for alternative fuels including biodiesel has become an urgent task. For the future application of biodiesel and its mixture, the thermophysical properties, especially the viscosity and interfacial tension are the important index to evaluate its liquidity, lubrication and atomization characteristics, and is of importance to design and optimize the engine injector as well as safety of oil supply. The work intends to carry out the following work. Firstly, with the new developed pendent drop experiment setup, the surface tension of several kinds of biodiesels and their mixtures were measured between 303 K to 363 K. For the complete temperature range, the pendent drop apparatus was firstly checked with water and heptane in the temperature range from 303 K to 363 K. The expanded uncertainties with a confidence level of more than 95 % ($k = 2$) are estimated to be ± 2 % for surface tension. And then, a DFT model will be developed for the calculation of the surface tension of biodiesel and its mixtures.