# Editorial

# Thermodynamics for Green Technology Development

The greenhouse effect and environment pollution challenge scientists and engineers to protect our earth by green product and green technology developments. During such developments, thermodynamics plays an important role either in early stage of process analysis or in the engineering scale of process operation and process design. In this supplement, four papers in different topics of thermodynamics are included and cover thermodynamic properties, phase equilibrium, book review, and model modification for being applied to the development of either green processes or green products of environmental issue.

In this supplement, the first paper is cosolvent selection for the extraction of sunflower oil for biodiesel production. Through experiments, the liquid-liquid equilibrium phase boundaries of sunflower oil, methanol, and potential cosolvent at 308.2 K were determined and utilized for estimating the model parameters of the NRTL and the UNIQUAC, respectively. The second paper is the phase behavior study when water moisture in atmosphere is absorbed into ethanol + gasoline fuel (gasohol) and causes possible phase separation in an automobile fuel tank or an underground storage tank. The phase separation could cause ethanol to be drawn into the aqueous phase, a loss of ethanol which is a power fuel in gasohol. The experimental data of liquid-liquid equilibria were collected for three ternary mixtures, three quaternary mixtures and one quinary mixture consisting of ethanol, water, pentane, hexane, and cyclohexane at three different temperatures. The third paper is a review article of a newly published book of ionic liquids (ILs). The ILs have the unique characteristic of low vapor pressure and considered as potential green solvents. The research on these compounds broadens the applications of ILs, such as to optical, electrochemical and biochemical sensor technology. "Perhaps no other field has been the subject of such an intensive research interest nor received such intense attention as ionic liquids (IL) are experiencing today" as said by the authors. But these compounds could have negative effect on environment when it is released by accidental spills or effluents and will cause water and soil pollution. The fourth paper is more theoretically related to the development of a model for activity coefficient estimation. The original van Laar equation for the excess Gibbs free energies of liquid mixtures has deficiencies that have prevented it from being applied to multi-component systems. Through the consideration of the parameters of the van Laar equation, the author's final form of the modified van Laar equation for multi-component mixtures involves two size parameters and an interaction parameter for each of the constituent binary pairs. This is an important breakthrough of this important equation since no researchers have successfully solved this problem.

This supplement provides only a very small part of thermodynamics related to green products and technologies. And the authors have long been devoted to research in the thermodynamics field. Hope that the readers would like their work and appreciate their contributions.

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