

## Characterization of Biofuels with the Advanced Distillation Curve Method

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Interest in the domestic production of bio-derived fuels, sparked by the high cost of petroleum crude oil, has led to consideration of fluids to replace or extend conventional petroleum derived fuels. Because of the complexity of bio-derived fluids, analytical characterization methods are limited. We have recently introduced a method (the advanced distillation curve method) that can be applied successfully to such fluids to obtain both composition and volatility information. This technique is an improvement of classical approaches, featuring (1) a composition explicit data channel for each distillate fraction (for both qualitative and quantitative analysis), (2) temperature measurements that are true thermodynamic state points that can be modeled with an equation of state, (3) temperature, volume and pressure measurements of low uncertainty suitable for equation of state development, (4) consistency with a century of historical data, (5) an assessment of the energy content of each distillate fraction, (6) trace chemical analysis of each distillate fraction, and (7) corrosivity assessment of each distillate fraction. In this poster, we present applications of this technique to biodiesel fuel, gasoline mixtures with the ethanol, butanols and gamma-valerolactone, the ethanol outputs from a fuel ethanol plant, and petroleum diesel fuel with bio-derived oxygenates. We show how the method can facilitate the development of thermodynamic models for these complex fluids.