Solubility of Dimethyl Sulfide in Water

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The solubility of dimethyl sulfide (DMS) in liquid solvents is of considerable interest to the chemical, natural gas, petroleum, food, and pulp and paper industries. In the petroleum and biogas industries, organic sulphurs, including dimethyl sulfide (DMS), are often captured in amine solvent systems. Since water is a major component in these amine solvents, it is important to understand the solubility of DMS in water.

There are limited data in the open literature for the solubility of DMS in water at elevated temperatures and pressures. The gaps in the literature data were addressed with new experimental solubility measurements at temperatures in the range (298.15 to 413.15) K over a wide range of DMS partial pressures. The new data expand upon the limited data available in the open literature for this system and can also be used as a boundary condition for any new (DMS + Amine + Water) modelling approaches.

The Peng-Robinson equation of state, and the cubic-plus-association (CPA) equation of state were used to correlate the new and existing data. Henry's law constants, from the literature and calculated from the equation of states, were correlated with temperature over the full temperature range. The experimental techniques, results, and the ability of the two equations of state to correlate the solubility of (DMS) + water will be discussed.