Modeling the Ammonia Solubility in Ionic Liquids Using a Cubic EoS

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Lately, several experimental studies have shown that ionic liquids exhibit, among other thermophysical properties, high gas solubilities. Accordingly, the use of an ionic liquid as gas separation media seems to be very promising particularly for the capture/sequestration of ammonia which has shown to be extremely soluble in ionic liquids as compared to other gases. Recently, several experimental works have appeared in the literature dealing with the solubility of ammonia in imidazolium-based ionic liquids at different temperature and pressure conditions. The purpose of this work is to present a formal modeling approach of the ammonia solubility in ionic liquids by the use of a cubic equation of state (Soave or Peng-Robinson) coupled with modern mixing rules of the Wong-Sandler type. The resulting modeling approach proves to be able to correlate and/or predict the ammonia solubility in ionic liquids over diverse conditions of temperature, pressure and solute composition.