

Solubility, Density, Viscosity and Heat Capacity of Mixtures of Ammonia with some Ionic Liquids for Absorption Refrigeration

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Ammonia is an excellent refrigerant for absorption heat pumps and chillers. Usually, the absorbent used for ammonia is water, but due to its low relative volatility it is required the use of rectification to separate both components after the generator, thus reducing the cooling capacity and the Coefficient of Performance COP [1]. Therefore, the use of ionic liquids (IL's) as potential absorbents to avoid the use of rectification process has arisen recently [2,3]. Their special properties, such as negligible vapor pressure and the possibility to tailor their properties according to the application, make them a very attractive option[4]. To evaluate the performance in absorption refrigeration system, it is necessary to study the thermophysical properties of the pure IL's and their mixtures with natural refrigerants as ammonia. In the case of ammonia, the available information of its solubility in ionic liquids is scarce[5,6], and there is no experimental information about other mixing properties. This work is focused on the measurement and modeling of some thermophysical properties such as solubility, density, viscosity and isobaric heat capacity of some ionic liquids as potential absorbents of ammonia for absorption refrigeration. The thermophysical properties of the mixtures were compared with conventional absorption refrigeration fluids.

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