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Densities and Surface Tensions of Ionic Liquids/Sulfuric Acid Binary Mixtures

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Keywords: Ionic liquid, Sulfuric acid, Density, Surface tension, Excess property

Abstract: The densities and surface tensions of [Bmim][TFO]/H_2SO_4, [Hmim][TFO]/H_2SO_4 and [Omim][TFO]/H_2SO_4 binary mixtures were measured by pycnometer and Wilhelmy plate method respectively. The results show that densities and surface tensions of the mixtures decreased monotonously with increasing temperatures and increasing ionic liquid (IL) molar fraction. IL with longer alkyl side-chain length brings a lower density and a smaller surface tension to the ILs/H_2SO_4 binary mixtures. The densities and surface tensions of the mixtures are fitted well by Jouyban-Acree (JAM) model and LWW model respectively. Redlich−Kister (R-K) equation and modified Redlich−Kister (R-K) equation describe the excess molar volumes and excess surface tensions of the mixtures well respectively. Adding a small amount of ILs (x_{IL}<0.1) into sulfuric acid brings an obvious decrease to the density and the surface tension. The results imply that the densities and surface tensions of ILs/H_2SO_4 binary mixtures can be modulated by

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