

Density and Viscosity of Aqueous Silver Nitrate/Olefin Solutions

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Aqueous silver nitrate forms a complex with the double bond of olefins, which can significantly affect the solubility compared to analogous paraffins. Due to this complex, silver nitrate can be used for separation of olefins from paraffins. Many physical properties are dependent on the composition of the solution, but there is a lack of studies on the physical properties of aqueous silver nitrate mixtures in the literature. We have measured the density and viscosity of silver nitrate solutions with different hydrocarbon, including olefins such as ethylene and propylene. The density of silver nitrate solutions drops with increasing olefin partial pressure. The behavior shows a linear relationship between the normalized density and hydrocarbon solubility that is independent of temperature. This linear relationship is different for each olefin and may be used to predict the solubility. The viscosity was also measured as a function of silver nitrate concentration, temperature, and pressure. There are more significant challenges to measuring viscosity due to the nature of silver nitrate. Analysis was done to understand the relationship in a similar manner to the density. These relationships may be used to predict characteristics of the solutions, such as solubility and viscosity, by using the relatively easier to obtain density measurements.