Influence of low water content on the thermo-physical properties of deep eutectic solvent choline chloride-urea and its application to colloidal dispersions

C. KERN - *Sorbonne Université, France & Universidade de Brasilia, Brasil*

Deep eutectic solvents (DES) are mixtures of a quaternary ammonium salt (here choline chloride) with a hydrogen bond donor (here urea). The two components, which are solid at room temperature, are here mixed in the proportion 1:2, to form the eutectic ChU 1:2, which is liquid at 300 K. DES are often biodegradable and biocompatible solvents and present physico-chemical properties similar to those of ionic liquids. They can thus be a less-expensive alternative to them at room temperature (up to typically 100°C) for potential applications., e.g., as dispersing solvents for magnetic nanoparticles.

However, the presence of water can affect the physical properties of DES, such as viscosity and density. The influence of small amounts of water (below 5w%) was carefully studied in this work, in order to provide an improved description of this DES up its driest state.

This DES was then used to disperse maghemite nanoparticles (around 10 nm). Colloidal stability was assessed at different scales by visual observation, optical microscopy, light and small angle X ray scattering, using the formerly determined physical parameters for the solvent. It appears that the particles can be perfectly transferred from water in the DES to lead to long –term stable dispersions.