

## Extractive Desulfurization of Fuels Using Choline Chloride-Based Deep Eutectic Solvents

**Authors :** T. Zaki, Fathi S. Soliman

**Abstract :** Desulfurization process is required by most, if not all refineries, to achieve ultra-low sulfur fuel, that contains less than 10 ppm sulfur. A lot of research works and many effective technologies have been studied to achieve deep desulfurization process in moderate reaction environment, such as adsorption desulfurization (ADS), oxidative desulfurization (ODS), biodesulfurization and extraction desulfurization (EDS). Extraction desulfurization using deep eutectic solvents (DESs) is considered as simple, cheap, highly efficient and environmentally friend process. In this work, four DESs were designed and synthesized. Choline chloride (ChCl) was selected as typical hydrogen bond acceptors (HBA), and ethylene glycol (EG), glycerol (Gl), urea (Ur) and thiourea (Tu) were selected as hydrogen bond donors (HBD), from which a series of deep eutectic solvents were synthesized. The experimental data showed that the synthesized DESs showed desulfurization affinities towards the thiophene species in cyclohexane solvent. Ethylene glycol molecules showed more affinity to create hydrogen bond with thiophene instead of choline chloride. Accordingly, ethylene glycol choline chloride DES has the highest extraction efficiency.

**Keywords :** DES, desulfurization, green solvent, extraction

**Conference Title :** ICSPT 2018 : International Conference on Separation and Purification Technology

**Conference Location :** Barcelona, Spain

**Conference Dates :** February 27-28, 2018