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## Green Solvents: Applications in Petrochemistry and Refining

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Ionic liquids (ILs) have attracted attention in many fields of scientific research. ILs have unique physical and chemical properties that showed a great potential as an alternative media in many applications. ILs are defined as low melting point, lower than 100 °C, salts consisting of organic cations and organic/inorganic anions. ILs have very low vapor pressure, non-flammable, tunable, and can dissolve both polar and non-polar compounds. However, the hazardous toxicity, the poor biodegradability of many ILs the high price, are serious drawbacks and new concepts were needed in order to utilize these systems in a more rational way. To overcome these drawbacks, a new generation of solvents, named Deep Eutectic Solvents (DES), has emerged as alternative to ILs. Formation of DESs can be obtained by mixing together two components that can be chosen to be cheap, renewable and biodegradable to form a eutectic mixture with a melting point lower than that of each individual component. DESs have similar physical-chemical properties to those of ILs, while being much cheaper and environmentally friendlier. Owing to these advantages, there is now of growing interest in DESs in many fields of research. DESs are chemically tailorable solvents since they can be designed by properly combining various quaternary ammonium or phosphonium salts with different hydrogen bond donors.

In this work, we discuss the application of both ILs and DESs in petroleum refining and petrochemical processes. Examples include, but are not limited to, separation of aromatics, desulfurization, denitrification, and carbon dioxide capture.

### Biography:

Enas Nashef received his Ph.D. in Chemical Engineering from University of South Carolina, USA in 2004. AlNashef joined King Saud University, Saudi Arabia, in 2004. In 2011, AlNashef was promoted to associate professor. AlNashef was very active in research related to green engineering and sustainability, mainly using ionic liquids and deep eutectic solvents. AlNashef moved to Abu Dhabi (UAE) where he is now an Associate Professor in the Department of Chemical Engineering at Khalifa University of Science and Technology. He co-authored more than 100 journal publications. He received 7 patents from US and EU Patent Offices.