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Denitrification of liquid fuel using ionic liquids & deep eutectic solvents

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A total of 168 comprising cations which include 1-ethyl-3- methylimidaozlium, 1-ethylpyridinium, 1-ethyl-1-methyl pyrrolidinium, 1-ethyl- 1-methylpiperidinium [EMPIP], 4-ethyl-4-methyl morpholinium, and 1,2,4-trimethylpyrazoliumcombined with 26 anions were investigatedand. Further, a total94 deep eutectic solvents (DESs) based on different combinations of salt cation, anion, hydrogen-bond donor (HBD) and salt: HBD molar ratio are screened via the conductor-like screening model for real solvents (COSMO-RS) for potential use in the extractive denitrification of liquid fuel. The extraction of nitrogen compounds using IL's and DES are driven by hydrogen-bonding interaction, structural orientation, charge – charge interaction, and orbital level interaction, etc. It was found that five member ring compounds report higher selectivity and capacitythan six member compounds. Ammonium-based DESs give higher selectivity but phosphonium-based DESs report higher capacity. Ternary liquid –liquid extraction experiments were conducted at room temperature with pyrrole and pyridinewith the concentration in the feed ranging from 5 to 50 wt%. It was observed that there is no solvent in the raffinate phases. The distribution ratio and selectivity were calculated and it's gave higher than one for all five member ring compounds. This LLE data were correlated with COSMO-RS model prediction which gave good agreement by means of RMSD value is 2.51%.

Biography:

Dr. R Anantharaj has received Ph.D degree from Indian Institute of Technology Guwahati, India in 2012. Till date, he has published more than 78 articles in international and conferences since 2010. He was the recipient of*ProSPER.Net-Scopus Young Scientist Award 2013* for Sustainable Development in Transport Category (Promotion of Sustainability in Postgraduate and Research) from *ELSEVIER* and *Thermax-ASSET Awards 2013 for best Ph.D. Thesis*, (Medal with INR 15000/-) from Bhabha Atomic Research Centre (BARC), India. *Petrochemical Processing Award in Malaysia 2014* (His Research Group) from IChemE Malaysia. PEARL – A Foundation Best Young Scientist in Chemical Engineering 2016, Madurai – 625021. Tamil Nadu. Venus International Foundation Best Young Scientist Award 2016 in Separation Process with Green Solvent At the moment, he is working as a Associate Professor in Department of Chemical Engineering, SSN College of Engineering, Chennai -603110 since March 2015, Chennai - 603110.