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**Synthesis and Application of New Surface Active Poly (ionic liquids)  
Based on 1,3-Dialkylimidazolium as Demulsifiers for Heavy  
Petroleum Crude Oil Emulsions**

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**Abstract:** Application of ionic liquids (ILs) and their polymers (PILs) as green chemicals in the petroleum industry is an original area of the research study. This work aims to synthesize new amphiphilic ILs based on dialkyl substituted imidazolium cations as a head groups combine with acetate and 4-(trifluoromethoxy) phenyl borate anions. Their surface activity and aggregation behaviors, in toluene and aqueous medium, have been investigated by surface tension, particle size distribution and zeta potentials measurements. The sizes of aggregates in water and toluene solvents have been investigated from the dynamic light scattering (DLS) measurements. The demulsification mechanism for the heavy crude oil / water emulsions at low water contents has been estimated from the fluorescent optical microscope in the presence of the prepared ILs and PILs. The demulsification performance of ILs and PILs demulsifiers was found to be considerably improved with incorporation of oxyethylene units into hydrophobic imidazolium cations, and increment the content of 4-(trifluoromethoxy)phenyl borate anions. The results confirmed that the PIL has stronger adsorption for asphaltene molecules facilitated the distortion of the asphaltene protective film that stabilized the water-in-oil

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