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Trihexyl (tetradecyl) phosphonium bis (trifluoromethylsulfonyl) amide as promising green solvent for extractive desulfurization from liquid fuels

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Now-a-days there are serious regulations to eliminate sulfur from fuels because the SOx created through the combustion of fuel containing sulfur compounds which causes air pollution and have hazardous environmental influence. Amongst numerous extractants, ionic liquids (ILs) are capable enough to extract sulfur due to their desirable green properties. This work demonstrated that trihexyl(tetradecyl)phosphonium0bis(trifluoromethylsulfonyl) amide (CyphosIL-109) was presented as promising extractant for extractive desulfurization (EDS) of dibenzothiophene (DBT), thiophene, benzothiophene and other alkyl substituted derivatives of sulfur from liquid fuel. The FTIR, NMR, UV, Raman and TG/DSC spectra have been discussed for the molecular purity confirmations and thermal stability. Further, physical properties of CyphosIL-109 were carried out. Effects of time, temperature, sulfur compounds, ultra-sonication and recycling/regeneration on DBT removal from fuel were also examined. In EDS, the DBT removal in n-dodecane was 83.1% with mass ratio (1:1) in 30 min at 30°C. CyphosIL-109 might be reclaimed six cycles without a substantial S-reduction. Also, S-removal from real fuel and multistage extraction performance was tested. The experimental data and results provided in this article discover the remarkable understandings of phosphonium ionic liquids as promising solvent for EDS.

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