

## Enhancing Reused Lubricating Oil Performance Using Novel Ionic Liquids Based on Imidazolium Derivatives

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**Abstract :** The global lubricant additives market size was USD 14.35 billion in 2015. The industry is characterized by increasing additive usage in base oil blending for longer service life and performance. These additives improve the viscosity of oil, act as detergents, defoamers, antioxidants, and antiwear agents. Since additives play a significant role in base oil blending and subsequent formulations as they are critical materials in improving specification and performance of oils. Herein, we report on the synthesis and characterization of three imidazolium derivatives and their application as antioxidants, detergents and antiwear agents. The molecular structure and characterizations of these ionic liquids were confirmed by elemental analysis, FTIR, X-Ray Diffraction (XRD) and <sup>1</sup>HNMR spectroscopy. Thermo gravimetric analysis (TGA), is used to study the degradation and thermal stability of the studied base stock samples. It was found that all the prepared ionic liquids additives have excellent power of dispersion and detergency. The ionic liquids as additives to engine oil reduced the friction (38%) and wear volume (76%) of steel balls. The obtained results show that the ionic liquids have an oxidation inhibitor up to 95%.

**Keywords :** reused lubricating oil, waste, petroleum, ionic liquids

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