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Fuel Properties of Distilled Tire Pyrolytic Oil and Its Blends with Biodiesel and Commercial Diesel Fuel

Authors : Moshe Mello, Hilary Rutto, Tumisang Seodigeng

Abstract : Tires are extremely challenging to recycle due to the available chemically cross-linked polymer which constitutes their nature and therefore, they are neither fusible nor soluble and consequently, cannot be remoulded into other shapes without serious degradation. Pyrolysis of tires produces four valuable products namely; char, steel, tire pyrolytic oil (TPO) and non-condensable gases. TPO has been reported to have similar properties to commercial diesel fuel (CDF). In this study, distillation of TPO was carried out in a batch distillation column and biodiesel was produced from waste cooking oil. FTIR analysis proved that TPO can be used as a fuel due to the available compounds detected and GC analysis displayed 94% biodiesel concentration from waste cooking oil. Different blends of TPO/biodiesel, TPO/CDF and biodiesel/CDF were prepared at different ratios. Fuel properties such as viscosity, density, flash point, and calorific value were studied. Viscosity and density models were also studied to measure the quality of different blends.

Keywords : biodiesel, distillation, pyrolysis, tire
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