

Characteristics of the separated plastic waste pyrolysis fuel from a 20 kg scale vacuum distillation system and its application as boiler fuel

왕 슈양, 이도연¹, 김하나, 남형석[†], 황병욱, 이경환, 류호정
한국에너지기술연구원; ¹한밭대학교
(namhs219@kier.re.kr[†])

In this work, plastic waste pyrolysis oil was comprehensively investigated using a 20 kg scale vacuum distillation system in the temperature range of 20–200 °C and the vacuum pressure range of 1–100 KPa by separating a total of 74 samples (No.1–74) at different temperatures and different vacuum pressures. The comprehensive characterization of the separated samples showed that with the increase of temperature and vacuum, the viscosity and TAN value of the samples increased, while the water content decreased. The samples of 1–25 showed similar properties to gasoline, including carbon range: C₅–C₁₃, viscosity range: 0.55–0.72 and HHV: 42–45 MJ/kg. However, the samples of 33–48 exhibited some characteristics close to kerosene, such as carbon range: C₉–C₂₀, viscosity range: 1.07–2.53 and HHV: 44–45 MJ/kg. The samples over No.52 contained more heavy oil content (> C₂₀) with a high viscosity of 3.12–7.55. The uniform transparent pictures and FTIR showed a good miscibility of separated samples and diesel. Finally, both characteristics of samples and the AET analysis are further used for the design of vacuum distillation setup for targeting desired products.