

## **Used industrial oil recycling using acid with low-cost adsorbents**

### **ABSTRACT**

The main objective of this research is to study the potential properties of used industrial oil (UIO) using acid clay treatment method. Acid treatment was done using glacial acetic acid followed by clay treatment using activated carbon (AC) or treated river sand (TRS). This study showed that a correlation of acid volume to the sludge formation in UIO. For hydraulic oil (HO) and automatic transmission fluid (ATF), it can be seen that the used HO results in a higher mass of wet and dry sludge formed as compared to the EO and ATF. The Fourier transform infrared spectroscopy (FTIR) showed that soot, oxidation and sulfation in ATF became undetected after the treatment. Initially, oxidation and sulfation peaks were detected by the presence of a sharp peak around  $2173\text{ cm}^{-1}$  and  $1717\text{ cm}^{-1}$  for ATF samples, while for HO samples, the treatment method was only able to reduce the soot content to an undetectable level. In recycled EO samples, both soot and oxidation problems were resolved. This study also proved that the theory of using TRS as an alternative low-cost adsorbent can be an alternative adsorbent although the UIO treated with AC showed better result.