

# Removal of metals from *flat* lubricating oils using a fabricated packed-bed reactor

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## Abstract

Packed bed reactor (PBR) was fabricated and its performance in removing metals from used (*flat*) lubricating oils was evaluated. A blend of locally produced diatomaceous materials was employed as sorbent. *Flat* lubricating oils from two brands (Mobil Super SAE-20W-50 and Total Quartz 5000 SAE-20W-50) were run through the PBR. Concentrations of the analysed metals in the used and treated oils were measured using Atomic Absorption Spectrophotometer and the results compared with those of unused (*virgin*) oils. Zinc, Mg, Ca, Na and K were detected in *virgin* oils; while all the analysed metals were detected in the treated and used oils but are of higher concentrations in the used oils. Cross plots have  $R^2$  values  $> 0.96$ , indicating high linear relationships of the impact of the treatment on the used oils. T-test results indicated that most of the metals showed significant differences between the mean values of the treated and used oils, indicating good treatment effects; while most of them indicated no significant differences between the mean values of the brands of oils used, indicating similar treatment effects on the two brands of oils. These results confirmed the high efficacy of the fabricated PBR for the purpose of recycling used oils.

**Keywords:** AAS, automobile engine, lubricating oil, metal, packed bed reactor, sorbent

**DOI:** <https://doi.org/10.1080/10916466.2018.1425719>

Journal of Petroleum Science and Technology

**Published by:** Taylor & Francis. on 2018/3/19