

Improvement of Diesel Oil Properties by Batch Adsorption and Simple Distillation Processes

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Abstract : In this research, diesel oil properties, such as aniline point, density, diesel index, cetane index and cetane number before and after treatment were studied. The investigation was considered for diesel oil samples after batch adsorption process using powdered activated carbon. Batch distillation process was applied to all treated diesel oil samples for separation of the solid-liquid mixture. The diesel oil properties were studied to observe the impact of adsorptive desulfurization process on fuel quality. Results showed that the best cetane number for desulfurized diesel oil was found at the best-operating conditions 60°C, 10g activated carbon and 180 minute contact time. The best-desulfurized diesel oil cetane number was obtained around 51 while the cetane number of untreated diesel oil was 34. Results also showed that the calculated cetane number increases as the operating temperature and amounts of adsorbent increases. This behavior was same for other diesel oil properties such as aniline point, diesel index, cetane index and density. The best value for all the fuel properties was found at same operating conditions mentioned above. Thus, it can be concluded that adsorptive desulfurization using powdered activated carbon as adsorbent had significantly improved the fuel quality of diesel oil by reducing aromatic contents of diesel oil.

Keywords : activated carbon, adsorption, desulfurization, diesel oil, fuel quality

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