

ABSTRACT

THE EFFECT OF USING HIGH NORMALITY BASES-PHYSICAL ZEOLITE PELLET ON A FOUR-STROKES DIESEL ENGINE PERFORMANCE

By

EKO HERMAWAN

Zeolites are alumina silicate compounds which physically and chemically have the ability as an (adsorbent), cation exchanger, and as a catalyst. In this study, the ability of zeolite as an adsorbent was used to filter air for combustion process in order to improve the performance of a 4- stroke diesel engine. In this study, zeolite that was activated through chemical activation using NaOH and KOH in order to clean the surface of the pores and get rid of impurities compounds, so that the zeolite bound nitrogen gas and water vapor when it was used. As the result, the air which has been filtered by zeolite would be rich of oxygen and made the combustion process in 4-stroke diesel engine better, that increase the engine performance. However, the activator which exceeded the optimal value of its normality might lead the change of the basic structure of zeolite that caused the decrease of its absorption ability.

In this test the zeolite was activated by alkaline using 1N;2N; 3N; 4N normality and physical activation at 200⁰C for 1 hour then formed into tablets and packaged in a frame that was placed on diesel air filter. Then the adsorben ability of zeolite was tested on 4-Stroke Diesel Engine at 1500, 2000, 2500, and 3000 rpm rotation variation.

From the test results and the analysis found that by the usage of zeolite that was physically activated could improve the performance of a 4-stroke diesel engine compared to those without usage of zeolites. The results also showed that the best normality occurred at 1N where the best increase of break power was (1,6605%) using NaOH 1N and (1.4724%) for KOH at 1N normality occurred at higher amount of zeolite both. The best decrease of brake specific fuel consumption was (2,836%) using NaOH 1N and (2,414%) for KOH 1N occurred at higher amount of zeolite both.

Key words: physical base activated zeolite, activator, normality, diesel engine performance