ABSTRACT

PYROLYSIS OF RUBBER SEED OIL USING ZEOLITE-A SYNTHESIZED FROM PUMICE SILICA AND FOOD GRADE ALUMINIUM FOIL AS CATALYST

By

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In this research, a pyrolysis study was conducted on a rubber seed oil using zeolite-A synthesized by hydrothermal method using food grade aluminium and amorphous silica extracted by sol-gel method using pumice. The extraction was performed using variations of NaOH concentration 2.5 M and 4 M. Characterization with XRD indicates that the silica extracted using NaOH concentration of 2.5 M is amorphous phase, while the silica extracted using NaOH concentration of 4 M is crystalline phase. Characterization using XRF indicates that the amorphous silica contains 81.41% SiO_2 and 10.29% Al_2O_3**.** Characterization using FTIR indicates the presence of siloxane bond (Si-O-Si) and silanol bond (Si-OH). The synthesized of zeolite-A was performed using variations of distilled water volume 150, 200, 250, 300 and 430 mL. Characterization using XRD indicates that only the synthesized using 430 mL distilled water contain zeolite-A. Before use, the zeolite-A were calcined at different temperatures of 600, 700 and 800 ℃. The first pyrolysis process was performed with and without silica sand as heat exchanger using 250 mL of rubber seed oil to produce BCO. Then, the BCO from first pyrolysis with silica sand was used to the second pyrolysis with zeolite-A as catalyst and 100 mL of BCO to produce upgraded fuel. The GC-MS analysis result show that the optimum zeolite-A catalyst was obtained at temperature of calcination of 600 ℃ with relative amount of biogasoline is 30.61%, while zeolite-A calcined at temperatures 700 and 800 ℃ has relative amount of biogasoline 22.27% and 29.36%.

Keywords: pyrolysis, pumice, amorphous silica, zeolite-A, rubber seed oil, BCO.