International Journal of ChemTech Research
CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.12 No.06, pp 46-56, 2019

Biodiesel Synthesis Through Transesterification of Used Cooking Oil Using NaN_3/Modified Clay Catalyst and The effect of Acetone as Co-Solvent

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Abstract : Transesterification of used cooking oil (UCO) using NaN_3/modified clay catalyst and investigation of the acetone effect have been done.The modified clay catalyst was synthesized by destructing the Merauke clay with8M HCl solution, then fusion by NaOH pellet, followed by treating with $AlCl_3.6H_2O$, CTAB and distilled water.Then the mixture was regulated to pH of 11.5. Next, the mixture was then poured into a reactor for hydrothermal process at 140 ^oC for 48 h. The results of the dealumination of clay was characterized byX-ray Fluorescence and the synthesized zeolite was characterized using surface area analyzer and X-Ray Diffraction.The synthesized zeolite was impregnated by NaN_3 as a precussor produced the NaN_3/modified clay catalyst sample.Rasio of catalyst :UCO : methanol was 1.0 : 20.0 : 13.3 and the ratio of aceton to methanol was 2:1. The transesterificationprocess was carried out at 60 and 65^oC. The liquid product was analyzed using Gas Chromatography Mass Spectrometer.The resulted showed that themodified clay had surface area of 5.5685 m^2/g, pore volume of 0.0126 cm^3/g, and pore diameter of 8.871 nm. The results of measurements with XRD produced a different form of chromatogram and type of mineral. The main mineral was gismondine.In this research, The transesterification of UCO using NaN_3/MC catalyst at 60 ^oC resulted methyl esters of 65.3 wt %.Furthermore, after adding acetone to the same treatment, the resulting methyl ester was 82.7 wt%.The transesterification of UCO at 65 ° C using NaN_3/MC catalyst and acetone produced the highest content of methyl esters or biodiesel that was equal to 94.4 wt %.
Keywords : clay, modified, transesterification, acetone, biodiesel.

Ilham Salim *et al* /International Journal of ChemTech Research, 2019,12(6): 46-56.

DOI= http://dx.doi.org/10.20902/IJCTR.2019.120607

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