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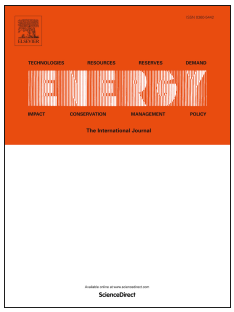

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Bio-fuel oil Characteristic from Catalytic Cracking of Hydrogenated Palm Oil

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Abstract: Pyrolysis characteristic of hydrogenated palm oil (HPO) was analyzed using TG, TG-FTIR-MS and Py-GC-MS. Bio-fuel oil (BFO) was obtained using catalytic cracking method. The BFO was analyzed by FTIR, ^{1}H-NMR, ^{13}C-NMR, GC-MS and ESI FT-ICR MS to provide complementary and comprehensive adequate information. TG-DTG results showed that the HPO pyrolysis was different with other plant oil. It was clear that HPO pyrolysis was mainly in temperature range of 350 ^{o}C-500 ^{o}C. The mean activation energy of HPO pyrolysis calculated from KAS and FWO models was 161.10 kJ/mol and 164.28 kJ/mol, respectively. According to TG-FTIR-MS results, little amount of gas components was detected. Py-GC-MS result found heavy compounds, which carbon number exceeds 18. FTIR, ^{1}H-NMR, ^{13}C-NMR and GC-MS results found the BFO mainly contained long-chain alkane and alkene. According to ESI FT-ICR MS, the oxygen containing compounds in BFO were from O_2–O_6 classes, with the O_2 being the major class. The RSFTIR was first used to analyze biomass pyrolysis. The results found that in the decarboxylation process, the carbon chain also was cracked to form short carbon chain carboxyl firstly. According to above experiments results, we can confirm HPO pyrolysis path was different with palm oil. The key conclusion was that HPO maybe was a good bio-resource to obtain BFO, and it was mainly contained diesel-like components. Compared to palm oil pyrolysis products, HPO pyrolysis products were mainly contained long-chain alkane and alkene. The recommended pyrolysis path was also proposed.

Keyword: hydrogenated palm oil, pyrolysis, bio-fuel oil, ESI FT-ICR MS

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