

ニッケル担持固体塩基触媒を用いた廃食用油由来バイオディーゼ ル燃料製造

(沼津高専¹)○望月隆志¹・伊藤拓哉¹

Production of Biodiesel from Waste Cooking Oil Using Solid Base Supported Nickel Catalyst

(¹National Institute of Technology, Numazu College) ○Ryuji Mochizuki,¹ Takuya Ito¹

When waste cooking oil is used as a feedstock for biodiesel, the problem is that the free fatty acids produced by the degradation of fats and oils in the conventional transesterification method cause loss of alkaline catalyst. Furthermore, if the waste cooking oil used as a feedstock contains the animal fats, it's the low temperature properties are poor. On the other hand, biodiesel derived from vegetable oils is also a problem because it contains a large amount of unsaturated fatty acid chains, which results in poor storage stability. Therefore, we focused on the decarboxylation method to obtain hydrocarbons by decarboxylating ester bonds of fats and oils. The hydrocarbon has a lower melting point and better storage stability compared to biodiesel obtained by conventional methods. We have studied nickel-supported activated carbon as a catalyst for decarboxylation, however the problem is that it produces a lot of the residue. In this study, we considered using a solid base support to selectively react with the carboxy groups and suppress the formation of residue. As a result, it was confirmed that the formation of residue was suppressed and the biodiesel yield was improved.

Keywords: biodiesel; decarboxylating; clog point; waste cooking oil; solid base supported nickel

廃食用油をバイオディーゼル燃料(BDF)の原料とすると、従来のエステル交換法では油脂の劣化により生成する遊離脂肪酸がアルカリ触媒を損失させることが問題である。さらに、原料となる廃食用油に動物油脂が含まれていると低温物性が悪く、一方で植物油脂由来の BDF も不飽和脂肪酸鎖を多く含むため貯蔵安定性が悪いことも問題である。そこで、油脂を脱炭酸することで炭化水素を得る脱炭酸法に注目した。炭化水素は従来法で得られる BDF と比較して融点が低く、貯蔵安定性も良い。著者らはこれまでに脱炭酸法の触媒としてニッケル担持活性炭について検討してきたが、残渣が多く生成することが問題である。本研究では、担体を固体塩基とすることでカルボキシ基を選択的に反応させて残渣の生成を抑制することを考えた。その結果、残渣の生成が抑制されると共に BDF 収率の向上も確認された。

