JHP-5 (Top), JCR-500 (Bottom)

No.A-019E

Related Product : Curie Point Pyrolyzer

Analysis of pyrolysates and their catalysates by connecting Catalytic Reactor with Pyrolyzer

Keyword:
Aromatization of Triglycerides, Reduction of Olefins

Introduction

In pyrolysis analysis, chromatograms of pyrolysates are obtained by connecting a pyrolyzer with GC/MS. By putting a catalytic reactor in between pyrolyzer and GC/MS, you can also analyze catalyzation products of the pyrolysates and evaluate catalytic reactions.

We made qualitative and quantitative analysis of pyrolysates and their catalysates to see what happened through catalytic reactions.

Experiment

Sample : Sesame oil
Instruments : Curie Point Pyrolyzer JHP-5, Catalytic Reactor JCR-500, GC/MS
: ※Fig. 1 : Cutaway view of JHP-5 and JCR-500 used in this experiment

■ Analysis of Pyrolysates of Sesame Oil

1. No catalyst was put into the reaction tube inside JCR-500
2. Channel flow temperature was set at 300°C with JCR-500
3. Sample was loaded to Pyrofoil 590 and set to JHP-5

■ Analysis of Catalysates of Sesame Oil Pyrolysates

1. Reaction tube (ID 4mm) was loaded with Zeolite pellet to the length of 50mm which was immobilized by glass wool at both ends.
2. Reaction temperature was set at 500°C

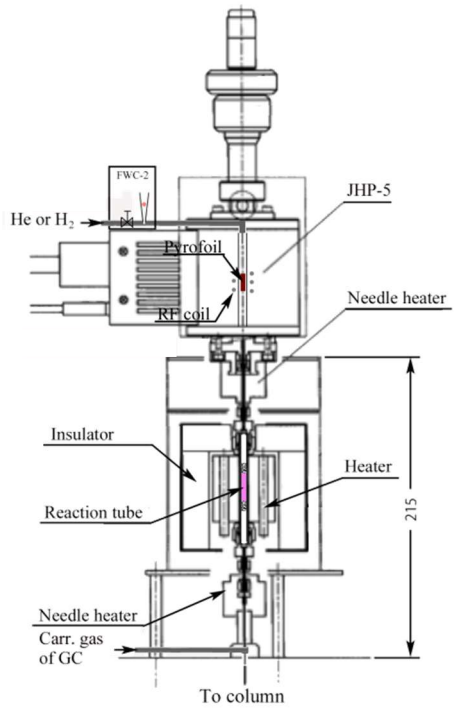

Fig.1 JHP-5 (Top), JCR-500 (Bottom)

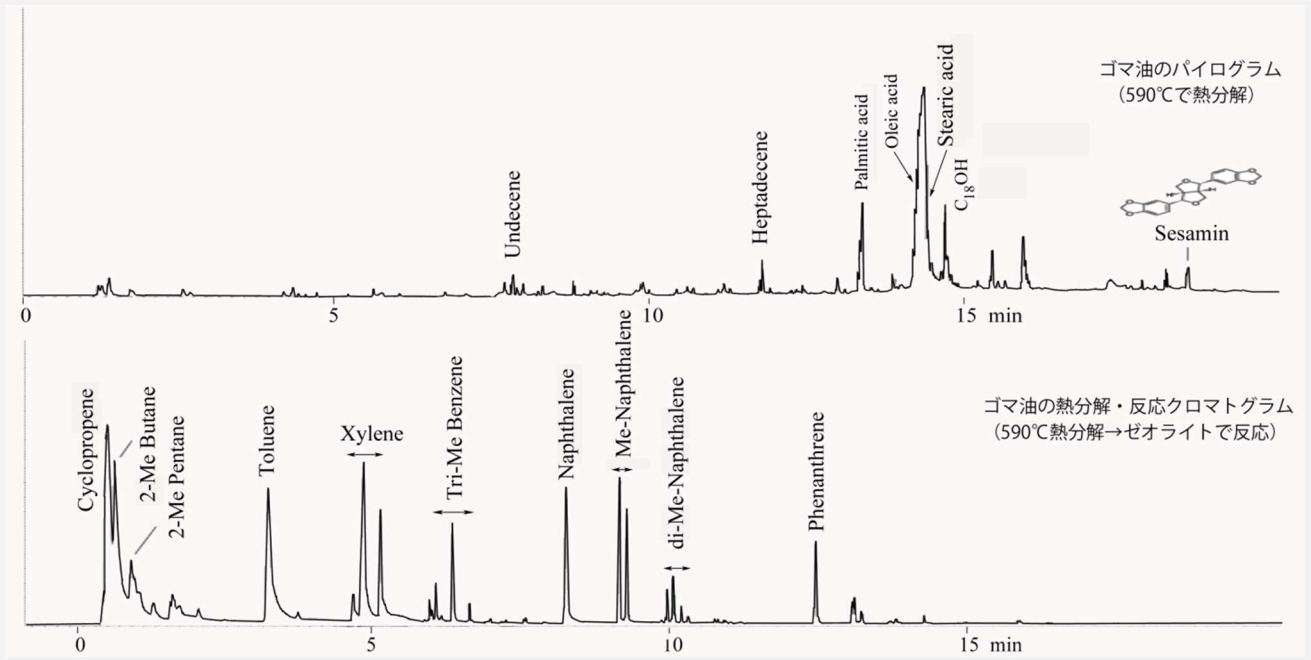

Fig. 2 Pyrogram of Sesame Oil (top) and Chromatogram of Catalysates of Pyrolysates (bottom)

Results

As shown on the pyrogram of Sesame Oil in Fig.2 top, characteristic components such as Stearic Acid, Oleic Acid, Palmitic Acid and Sesamin were detected.

On the other hand, as shown on the chromatogram of reaction products in Fig.2 bottom, there are no such peaks and many kinds of low boiling point aromatic compound were detected. It became clear that all the pyrolysates were totally converted to aromatics like Toluene and Xylene by the catalytic reactions.

Remarks

Temperature of catalytic reaction can be freely set in 1°C increments up to 700°C.
Flow rate of reaction gas or catalysis products can be freely adjustable by using Flow Controller FWC-2

The chromatogram above was obtained by fine separation using DB-5 (0.25 mm × 30 m) column. If our system of Hybrid Pyrolyzer JHI-08 is used, you can observe catalysates in real time.

Catalytic Reactor JCR-500			
Temperature Range	40 to 700°C (1 ° C increments)	Flow Controller (FWC-2)	Up to 3 Flow Channel (ex. H2, He, Air)
Reaction Tube	1/4 inch o.d. × 4 mm i.d.	Controller	Temperature Control, etc.
Temp. Control	Constant Temperature	Measure , Weight	JCR-5 : 100(W) × 215(H) × 110(D) mm / 4 Kg FWC-2 : 100(W) × 215(H) × 110(D) mm / 2 Kg
Needle Heater Temp.	40 to 350°C (1 ° C increments)	Power Source	100 V, 8 A or 220 V, 4A

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April 2020