



Curie Point Injector JCI-22

Thermal decomposition additives in Polyethylene

Before using JCI-22, analyze paraffine mix only with GC/MS. (The first chromatogram). Using this chromatogram as a guide for identification and quantification of thermally decomposed HDPE by JCI-22.

Following chromatograms show outgas and thermally decomposed pyrograms using pyrofoils are F220, F423 and F590.

With F590, the last chromatogram shows monoolefin, diolefin and paraffine, three peaks each were detected up to c-41.

With F423, partial decomposition were obtained.

With F220, decomposition were not obtained. (Only a single peak each detected.)

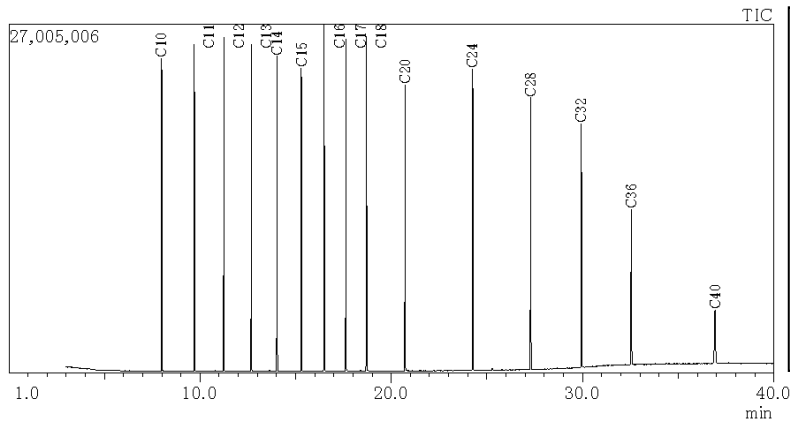
In comparison with GC/MS paraffine mix chromatogram, these single peaks were identified as n-paraffine. These n-paraffine were added to HDPE as lubricant.

100ng C-16 area peak was 37×10^6 with GC/MS. Total area peaks of n-paraffine was 35×10^6 with JCI-22 with pyrofoil F220 and this sample amount was 8.98mg.

From this result, Lubricant added in HDPE can be estimated appx 10ppm.

Analysis Condition

JCI-22	Pre-heater	ON	
	Purge gas	ON	
GC-17A	Constant flow mode		
	Column flow rate	1.0ml/min (He)	
	Velocity	36.1cm/sec	
	Oven temperature	Initial: 40°C(3min)	
		Rate: 10°C/min	
		Final: 320°C(9min)	
	Head pressure	Initial: 48.9kpa(3min)	
		Rate: 3.8kpa/min	
		Final: 155.3kpa(9min)	
	Analysis time	40min	
	Injector temperature	320°C	
	Detector temperature	320°C	
	Equivalent time	3min	
	Split ratio	1/100	
Total flow rate	103ml/min		
Purge gas flow rate	5.0ml/min (at 100kpa)		
QP-5000	Mass range	33-550	
	EM gain	1.70kv	
	Solvent cut	0min	
	Scan time	0.2-40min	
Column	DB-5MS	Inside diameter: 0.25mm	
		Length: 30m	
		Film thickness: 0.25um	



GC/MS

Sample: Paraffine mix 1uL

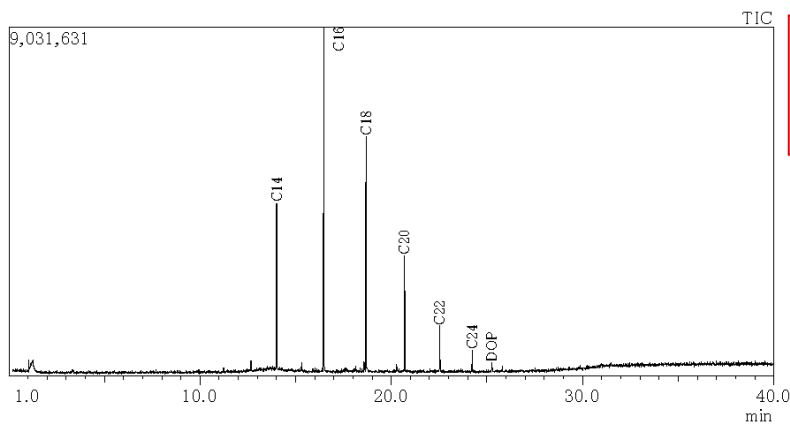
Inj. temp: 320c

Paraffine mix 100ng each / 1uL

n-paraffin 16 compounds eluted in Hexane

<n-Paraffin>

n-C10, n-C11, n-C12, n-C13, n-C14, n-C15,
n-C16, n-C17, n-C18, n-C20, n-C24, n-C28,
n-C32, n-C36, n-C40, n-C44

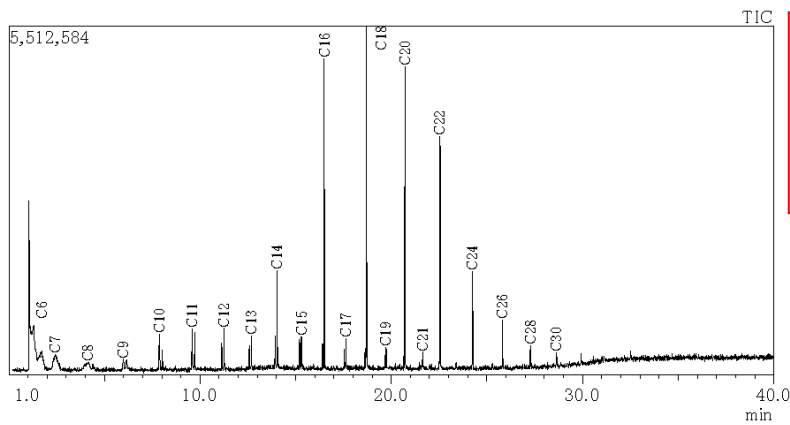


JCI-22, GC/MS

Sample: HDPE 8.98mg

Pyrofoil: F220

Py-period: 15sec



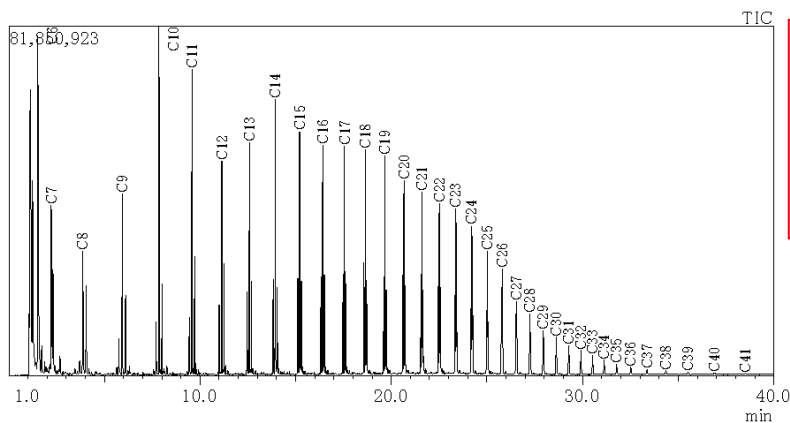
JCI-22, GC/MS

Sample: HDPE 4.8mg

Pyrofoil: F423

Py-period: 15sec

*Partially decomposed



JCI-22, GC/MS

Sample: HDPE 0.33mg

Pyrofoil: F590

Py-period: 5sec

Detected 3 peaks each up to C-41
(monoolefin, diolefin, paraffine)