

Analysis of Food Wrap Film Using Double-Shot Pyrolyzer®

Part 1 : Analysis with Evolved Gas Analysis (EGA)

Analysis of thermal properties of food wrap films is important in that food wrap films may directly contact foods at elevated temperatures and volatile components from films can elute off into foods, causing adverse effects to human body in prolonged exposures. Temperatures at which volatile materials evolve from various food wrap films were determined by the EGA technique employing Double-Shot Pyrolyzer®. Wrap films made of Polyvinylidene chloride (PVDC), polyvinyl chloride (PVC), and polypropylene+nylon (PP+nylon) were tested, and broad peaks due to volatiles from the films were observed in 100 to 250°C range. From the results elution temperatures of volatile components and their percentages against basic polymers were found. Also, mass spectra of volatiles can give insights into the chemical structures of the materials.

Table 1. Basic Polymers and Additives of Various Food Wrap Films

Basic Polymer	Additives
PVDC	Fatty acids derivatives, Epoxidized vegetable oils
PVC	Aliphatic esters, Epoxidized vegetable oils Calcic compounds, Silver antibiotics
PE	None
PP+nylon	Aliphatic hydrocarbon resins, Fatty acids derivatives

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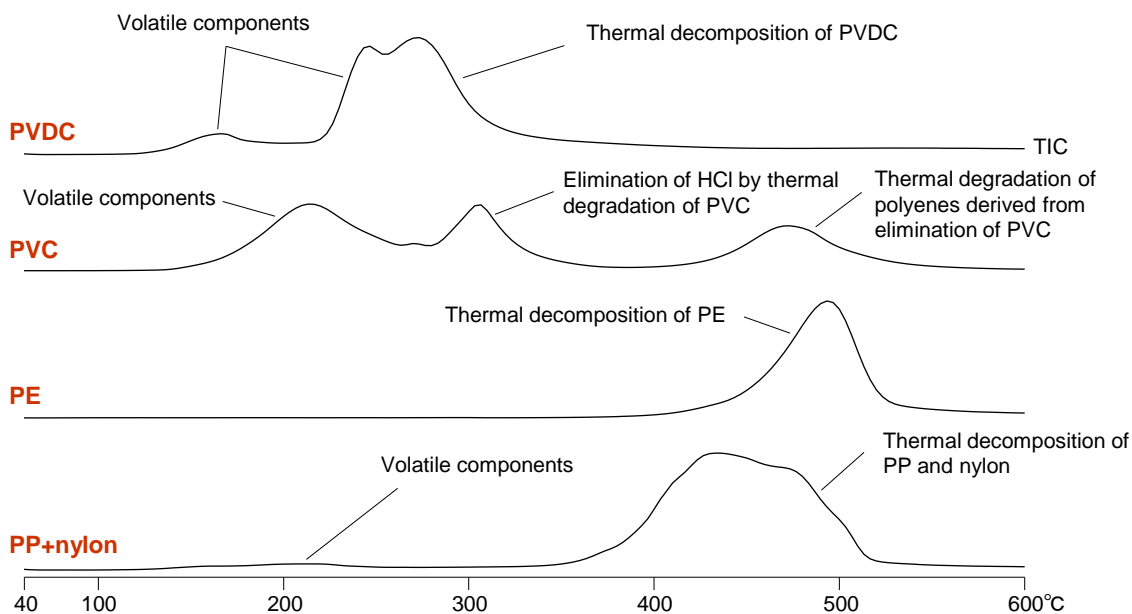


Fig. 1. EGA Curves of Various Food Wrap Films

Pyrolysis furnace temp: 40–600°C (20°C /min), Carrier gas : He 50kPa, Split ratio: ca.1/50
EGA capillary tube: id 0.15mm, Length 2.5m (UADTM-25N), GC oven temp.: 300°C
Injection port temp: 320°C, Sample size: 0.25cm², MS scan range : m/z=29–400, Scan rate : 0.1scan/sec

Keywords : Food wrap films, Volatile components, Evolved Gas Analysis (EGA)

Products used : Multi-functional pyrolyzer, UADTM-2.5N

Applications : Film manufacturing, General polymer analysis

Related technical notes :

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