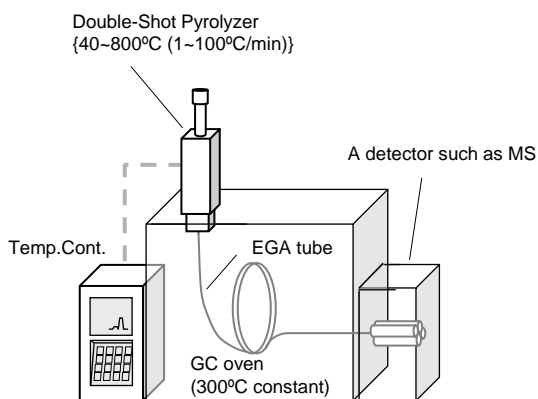


## Three Analytical Techniques of Double-Shot Pyrolyzer<sup>®</sup> PY-2020D & iD Part 1: Evolved Gas Analysis

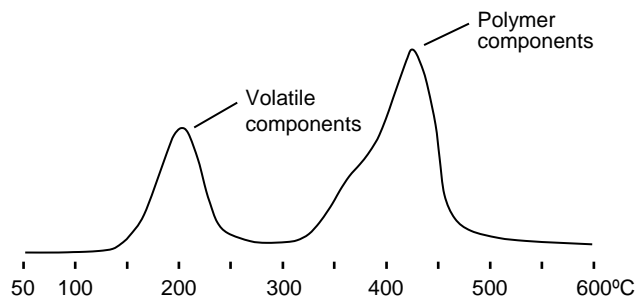
This is a simple thermal analysis method in which a sample temperature is continuously raised and resulting evolved gases are directly measured by a detector. The data obtained provides a lot of information<sup>1),2)</sup> including thermal desorption parameters for volatile components and start/end temperatures for pyrolysis of a polymer. Fig. 1 shows the configuration of the instrument. Double-Shot Pyrolyzer is connected to a detector via an EGA tube (a deactivated metal capillary tube designed for evolved gas analysis, 0.15mm id, 2.5m in length), and the GC oven temperature is held constant at 300°C. This setup allows evolved gases from a heated sample inside the pyrolyzer to be directly measured by a detector. Note that the transfer line, an EGA tube, is placed inside the GC oven to afford a system with no cold-spot in the flow path up to the detector. Fig. 2 shows an EGA curve of acrylonitrile butadiene rubber (NBR). A broad peak arising from volatile components such as additives is observed in the 120°C to 300°C region. Another peak observed in the 320°C to 500°C region is due to main components from thermally decomposed NBR. These results indicate that volatile components from the sample should be analyzed by thermal desorption from 100°C to 300°C, while instant pyrolysis of the polymer should be performed in the 550°C region, +50 to 100°C above the peak end temperature.

- Reference: 1) PYA3-001E (Correlation of Thermal Gravimetric Analysis and Evolved Gas Analysis using Double-Shot Pyrolyzer)  
2) PYA1-004E (Analysis of Antioxidants in Acrylonitrile Butadiene Rubber)



**Fig. 1 Configuration of Evolved Gas Analysis**

Pyrolysis furnace temp.: 50~600°C at 20°C/min  
 Interface temp.: 320°C  
 Injection port temp.: 320°C  
 Column oven temp.: 300°C  
 Detector : FID



**Fig. 2 Evolved Gas Curve of NBR**

**Keywords :** Basic Performance, Py-GC System, Evolved Gas Analysis

**Products used :** Multi-functional pyrolyzer, UADTM-2.0N

**Applications :** General Polymer Analysis

**Related technical notes :**

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