

PYROJECTOR II™

AFFORDABLE PYROLYSIS THAT WORKS

Selectable Constant Temperature Pyrolysis for Gas Chromatography

INTRODUCTION

Pyrolysis-chromatography is a potent analytical tool able to thermally crack (fragment) essentially non-volatile molecules into fragments suitable for chromatographic analysis. The technique enables a reproducible and characteristic "fingerprint" to be generated of a non-volatile sample. The technique can be applied to such varied tasks as bacterial strain differentiation and forensic characterisation of paints, polymers and fibre cross-matching.

THE SGE PYROJECTOR II

SGE's Pyrojector Series II is an economical continuous mode microfurnace pyrolyzing inlet. It provides a constant temperature furnace with sample introduction systems designed for both liquid and solid samples.

The Pyrojector II furnace assembly can be connected to an existing packed or capillary GC via a simple furnace to injector adaptor. The microfurnace is designed to operate at elevated temperatures in excess of 900°C for extended periods.

The SGE Pyrojector II unit consists of two modules:

1. A Pyrolyzer furnace - thermocouple assembly with various sample introduction

heads and quartz liner. This module is coupled to the Gas Chromatograph by an instrument specific adaptor.

2. A control module incorporating a digital temperature control with readout system and a carrier gas control with digital pressure readout.

STANDARD SAMPLE INJECTION TECHNIQUES

The Pyrojector II is supplied with three types of sample introduction injectors.

1. Septum Injector Head
2. Septumless Injector Head
3. Pelletiser Injection Head

SEPTUM INJECTOR HEAD

This injection technique is through a prepunctured septum and is for the introduction of

liquid with a conventional type microlitre syringe, or solid samples using the SGE solids syringe. The injector system is ideal where a large number of liquid samples are to be analysed.

SEPTUMLESS INJECTOR HEAD

The septumless injector is suited for the introduction of solid samples using the SGE solids injector syringe.

The septumless injector utilises a seal that opens to allow the introduction of a syringe needle and then closes around the needle. The design also excludes the introduction of oxygen into the pyrolysis zone.

Using the septumless injection head a large number of samples can be pyrolyzed without the need to cool or clean the furnace liner.

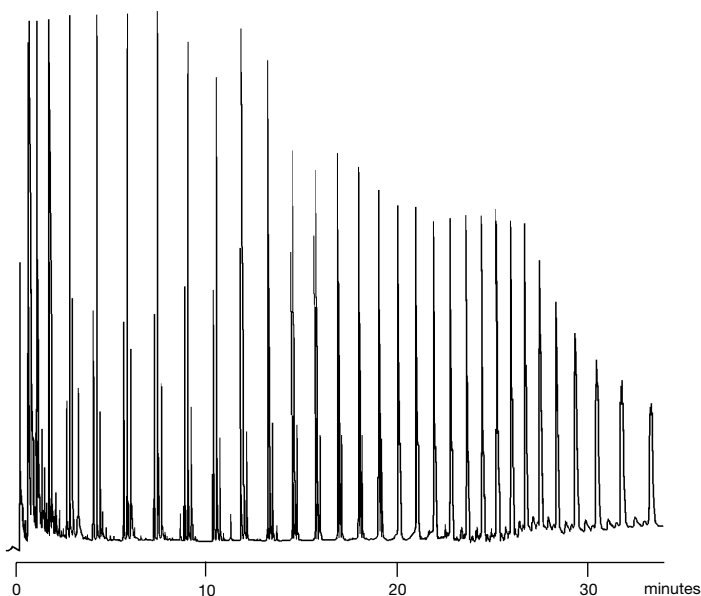


PYROLYSIS - GAS CHROMATOGRAPHY OF POLYOLEFINS

Pyrolysis and Injection Conditions

Pyrolysis Injector: Pelletiser Solids Injector
Pyrolysis Temp.: 800°C
Injection Mode: SGE Uninjector Split
Split Ratio: 100:1

Phase: BP1- 0.5µm film
Column: 25m x 0.32mm I.D.
Initial Temp.: 50°C, 0min
Rate: 10°C/min
Final Temp.: 320°C, 10min
Carrier Gas: H₂, 40cm/sec
Detector: F.I.D.
Sensitivity: 256 x 10⁻¹² AFD

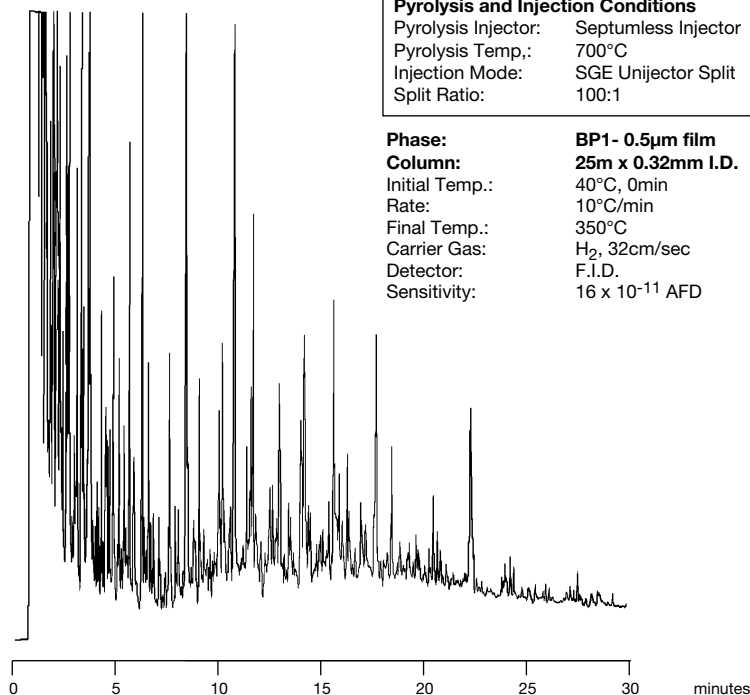


PYROLYSIS - GAS CHROMATOGRAPHY OF YEAST

Pyrolysis and Injection Conditions

Pyrolysis Injector: Septumless Injector
Pyrolysis Temp.: 700°C
Injection Mode: SGE Uninjector Split
Split Ratio: 100:1

Phase: BP1- 0.5µm film
Column: 25m x 0.32mm I.D.
Initial Temp.: 40°C, 0min
Rate: 10°C/min
Final Temp.: 350°C
Carrier Gas: H₂, 32cm/sec
Detector: F.I.D.
Sensitivity: 16 x 10⁻¹¹ AFD



PELLETISER INJECTION HEAD

The Pelletiser Solids Injector is suitable for the introduction of larger solid samples. This injector has an inside diameter of 1.6 mm and is designed for the use of samples up to 10 milligrams using the P-3 glass pelletiser tube. The pelletiser head is suitable for the determination of low level organics in solid materials, such as coal, petroleum source rocks and sediments.

FEATURES OF SGE'S PYROJECTOR II

DESIGN:

- Improved performance over other types of pyrolysis systems, as the furnace is operated isothermally.
- Sample can be simply injected directly into the furnace.

ADVANTAGES:

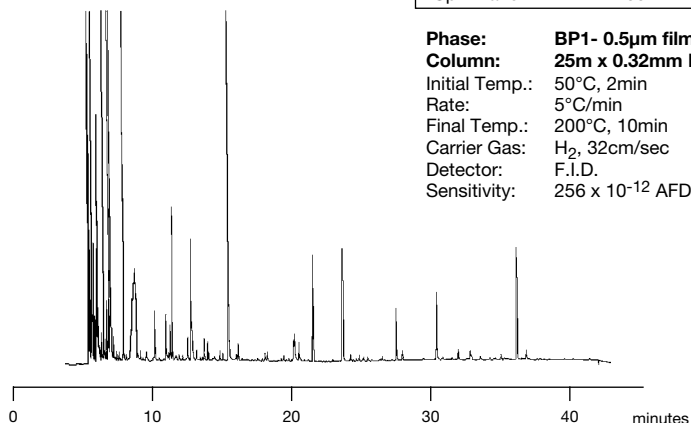
- Pyrolysis temperature and conditions can be controlled precisely and reproducibly.
- Temperature at which the fragmentation occurs is precisely known.
- Reproducible sample sizes are easily achieved.
- Little sample preparation required.
- Sample injected directly into heated furnace zone.
- Ideally suited for use with capillary columns as pyrolysis is rapid and the sample is transferred to the column head in a narrow band giving sharp peak shape.
- Reproducibility better than 0.4% R.S.D can be obtained.
- Inexpensive.

PYROLYSIS - GAS CHROMATOGRAPHY OF AUTOMOTIVE BLUE ACRYLIC SPRAY PAINT

Pyrolysis and Injection Conditions

Pyrolysis Injector: Pelletiser Solids Injector
 Pyrolysis Temp.: 800°C
 Injection Mode: Split
 Split Ratio: 100:1

Phase: BP1- 0.5µm film
 Column: 25m x 0.32mm I.D.
 Initial Temp.: 50°C, 2min
 Rate: 5°C/min
 Final Temp.: 200°C, 10min
 Carrier Gas: H₂, 32cm/sec
 Detector: F.I.D.
 Sensitivity: 256 x 10⁻¹² AFD



APPLICATION AREAS

The Pyrojector can be used in a range of industries principally as a qualitative guide to composition or identity of materials.

1. Polymers and Plastics

- Plastic/polymer identification fingerprinting
- Structural information
- Trace contamination determination
- Quality control

2. Biological

- Cellulose and polyamide fingerprinting
- Structure determination (eg. hair, wool and silk)
- Micro-organism identification
- Analysis of drugs in body tissue and fluid
- Many other clinical biological and biochemical applications.

3. Drugs

- Identification and purity
- Structural information
- Quantitative analysis

4. Forensic

- Identification of materials and their origin
- Pyrolysis has been used to help identify paints, plastics, fibres, timber, soil and numerous other materials concerned with the area of criminal and fraud investigation.

5. Paint industry

- Fingerprinting of volatiles
- Raw paint fingerprinting
- Quality control

6. Geochemical

- Characterising geochemical samples
- Identification of organic matter

7. Natural products

- Wood identification
- Vegetation origin

8. Thermal degradation products

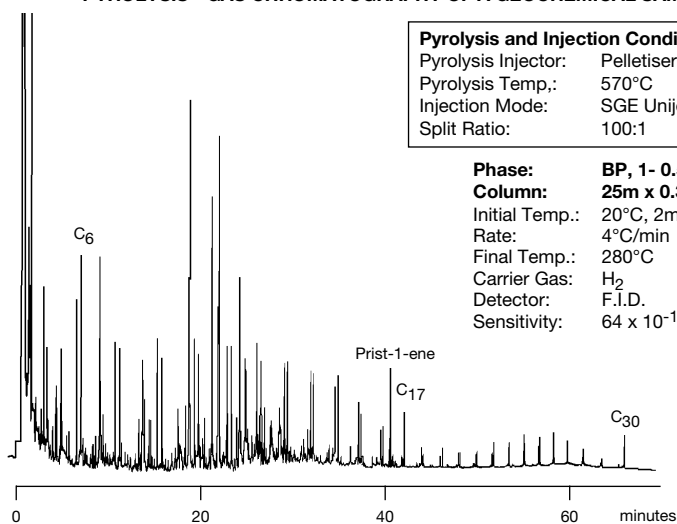
- Characterisation of thermal degradation of products
- Material decomposition temperatures
- Thermal oxidation products

PYROLYSIS - GAS CHROMATOGRAPHY OF A GEOCHEMICAL SAMPLE

Pyrolysis and Injection Conditions

Pyrolysis Injector: Pelletiser Solids Injector
 Pyrolysis Temp.: 570°C
 Injection Mode: SGE Uninjector Split
 Split Ratio: 100:1

Phase: BP, 1- 0.5µm film
 Column: 25m x 0.32mm I.D.
 Initial Temp.: 20°C, 2min
 Rate: 4°C/min
 Final Temp.: 280°C
 Carrier Gas: H₂
 Detector: F.I.D.
 Sensitivity: 64 x 10⁻¹² AFD

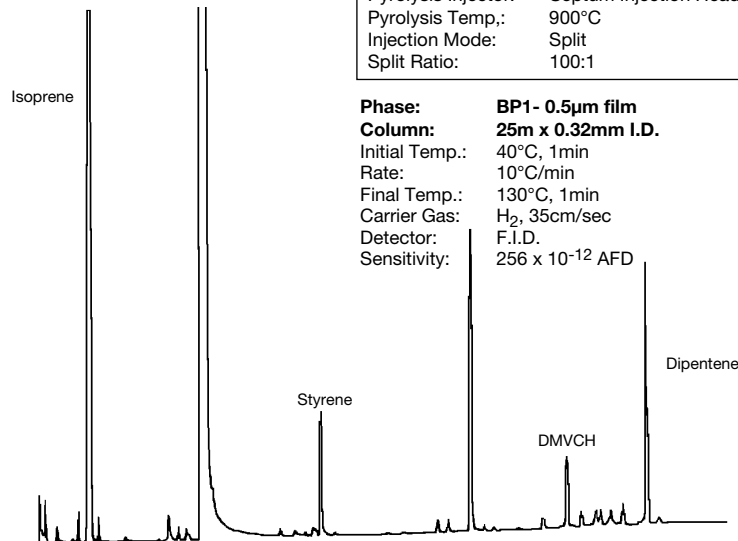


PYROLYSIS - GAS CHROMATOGRAPHY OF PRODUCTS OF n-BUTYLBENZENE

Pyrolysis and Injection Conditions

Pyrolysis Injector: Septum Injection Head
 Pyrolysis Temp.: 900°C
 Injection Mode: Split
 Split Ratio: 100:1

Phase: BP1- 0.5µm film
 Column: 25m x 0.32mm I.D.
 Initial Temp.: 40°C, 1min
 Rate: 10°C/min
 Final Temp.: 130°C, 1min
 Carrier Gas: H₂, 35cm/sec
 Detector: F.I.D.
 Sensitivity: 256 x 10⁻¹² AFD



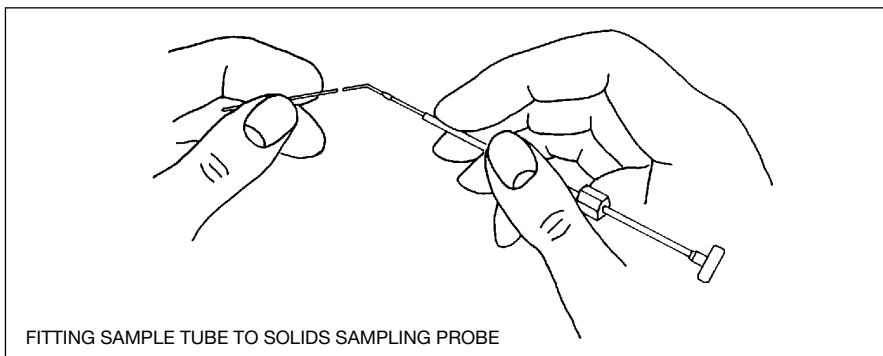
PYROJECTOR II™

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SOLIDS SAMPLING ACCESSORY KIT

Quantitative analysis of difficult matrices, such as organic additives in concrete, or shale, is facilitated by means of a Solids Sampling Kit.

Solid samples may be placed in quartz tubes, 50mm x 530µm ID and weighed if required. The tubes are then fitted onto a spring steel hook which is part of a special adaptor and introduced into the furnace for analysis. Once the sample is analysed, the tube is removed from the furnace and replaced with another. The sampling head can be fitted to any model Pyrojector in moments and can be retrofitted to existing units in the field at any time.



Projector II System consists of a furnace control module, solid sampling kit and installation kit.

Description

Part No.

Projector II Pyrolysis System
(110-240V 50-60 Hz) including
adaptor to fit GC of choice

095000

IMPORTANT:

When ordering specify make and model of your GC.

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