EXHIBIT
WBR M-3

What's new about the CH 4 B?

KRUPP

Sample inlet without thermal decomposition:

For structure analyses of solid substances the samples are placed close to the ionizing beam into which they are vaporized like a molecular beam. A special feature of this inlet is the independence of sample and ion source temperatures, allowing sample vapour temperatures well below ambient.

Systems for optimum coupling of gas chromatographs to the CH 4 B:

The ion source head is equipped with a feedthrough allowing direct connection of capillary columns to the ionization chamber of the ion source. With this connection, sample loss is completely eliminated up to flow rates of 1 ml/min.

For capillary columns with a flow rate higher than 1 ml/min. and for packed columns, suitable helium separators are available which remove almost all of the helium carrier gas from the chromatograph effluent. Effluents are enriched by a factor of 50 (capillary columns) or 200 (packed columns) respectively for a molecular weight of 400.

Higher resolution:

For the simultaneous recording of mass spectra and uninterrupted gas chromatograms we deliver a pressure-measuring ion source (double ion source system) in addition to the standard ion source of the mass spectrometer, which also has suitable application in the control of sample vaporization (quasi-molecular beam inlet) by measurement of the total pressure in the ion source.

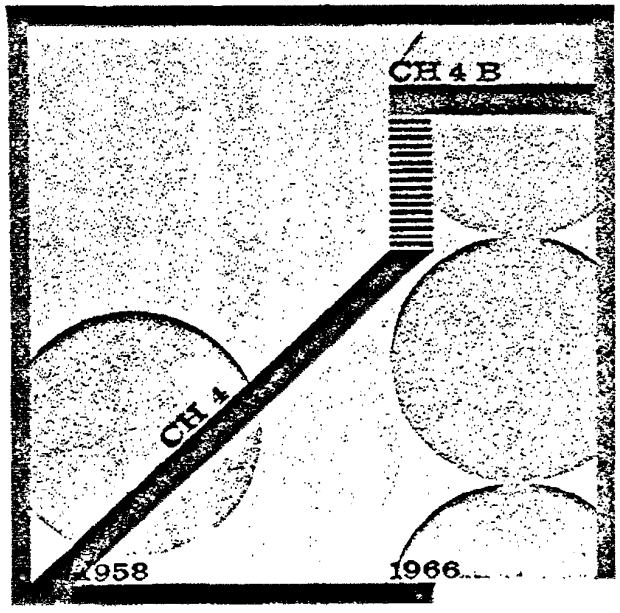
The instrument resolution has been increased to A = 4000, thus broadening the application range to include qualitative analyses, for which double focusing instruments were required up to now.

Digital indication of mass numbers:

The value of the selected mass number is indicated by neon glow tubes. Every fifth or tenth mass number is also marked on a recorder chart with an accuracy of ± 0.2 u at 500 u and ± 0.4 u at 1000 u respectively.

FRIED. KRUPP
MESS- UND ANALYSENTECHNIK · BREMEN
28 Bremen 10
Postfach 4062

M – 1307e



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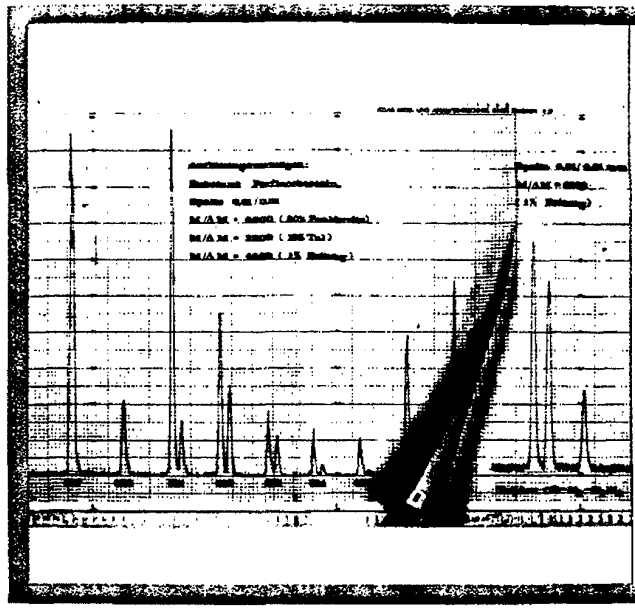
performance data

The Mass Spectrometer CH4 has increased its lead in the field of analytical chemistry.

Result:

The new ATLAS Mass Spectrometer CH4B capable of even greater achievements deals with all analysis problems in organic chemistry – the outcome of 15 years of experience.



Sensitivity	
for analyses of organic solids:	$1 \cdot 10^{-9}$ Coul/µg max., i. e. evaluable spectra are obtained with a sample quantity of 0.01 µg
for analyses of gas chromatographically separated fractions:	evaluable spectra are obtained with as low as 0.001 µg of a separated component. Detection limit: $1 \cdot 10^{-6}$ µg
for partial pressure sensitivity:	$1 \cdot 10^{-4}$ amp/Torr max. (without multiplier) 100 amp/Torr (with multiplier)
Dynamic range:	10^{8} : 1
Mass range:	1 u . . . 1100 u (800 u) at full ion energy 2 u . . . 3300 u (2400 u) at reduced ion energy
Resolution:	M/Δ M = 5500 (50 % peak width) M/Δ M = 4000 (1 % contribution) M/Δ M = 2800 (10 % valley)
Measuring period:	Recording of a mass spectrum from 40 u to 600 u in 1 seconds (0.25 sec. per mass octave or 0.8 sec. per mass decade).

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