Analysis of Straight-Run Gasolines by Means of the Raman Effect.

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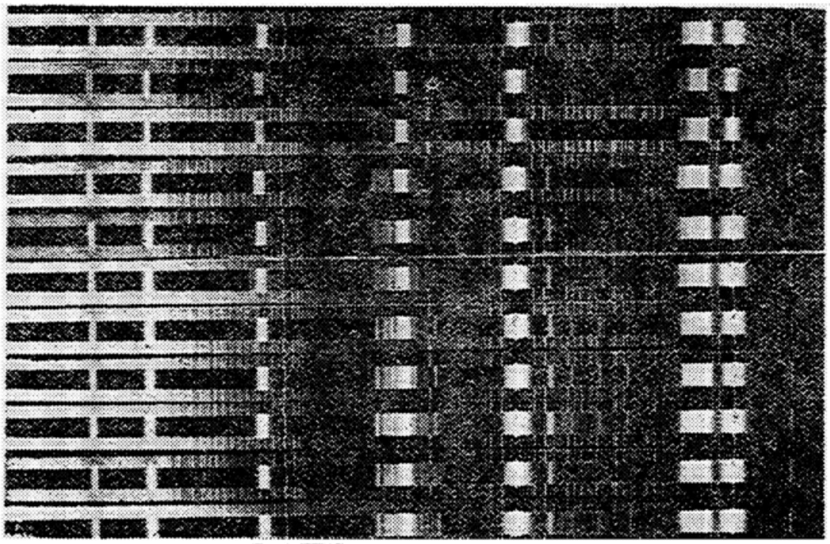
The analysis of hydrocarbon mixtures such as gasolines is by no means easy, so far as we adopt only the ordinary chemical procedure. This difficulty can, however, be overcome by the application of Raman effect, because each hydrocarbon molecule has its characteristic Raman lines whose frequencies are not appreciably modified by the presence of other hydrocarbon molecules. The present note deals with the analysis of some straight-run gasolines (end point 150°C) of Sumatra and Borneo by this optical method.

Each of the five samples of straight-run gasolines (Sanga-Sanga, Rantau, Pentopo, Seria, and Miri) were distilled carefully through a long column into 20 ~ 25 fractions and for each fraction the Raman spectrum was measured (see the photograph). Two spectrographs of our own construction were used in this measurement, the larger one having three prisms of the height of 10 ~ 15 cm. From the determination of the in-



The Raman Spectra of Rantau-gasoline (for the fractions of ~30°C, 30~55°C, 55~60°C, 60~65°C, 65~70°C, 70~75°C, 75~80°C, 80~85°, 85~90°C, 90~95°C and 95~100°C) tensity of Raman lines assigned to a definite hydrocarbon[1] these samples were analysed as shown in the table. The components thus determined

Table

Component \ Gasoline	Sanga Sanga	Rantau	Pentopo	Seria*	Miri*
Isobutane		T†	T	0.1	0.1
n-butane		T	1	0.1	0.1
2, 2-Dimethyl propane		T	T	T	T
Isopentane	2	1	1	0.5	0.5
n-Pentane	2	1	1	1	1
2, 2-Dimethyl butane	1	1	T	0.2	0.5
Cyclopentane	1	1	1	0.5	1
2, 3-Dimethyl butane	1	2	1	0.3	0.5
2-Methyl pentane } 3-Methyl pentane }	4	2	4	2.5	2.5
n-Hexane	3	2	5	2.5	1.5
Methyl cyclopentane	2	2	3	1	1.5
2, 2-Dimethyl pentane	1	1	T	0.5	0.1
Benzene	7	1	2	1.8	1.5
Cyclohexane	6	5	3	5	8
2, 4-Dimethyl pentane	2	1	1	0.4	0.1
2, 2, 3-Trimethyl butane		T	T	T	0.05
3, 3-Dimethyl pentane	1	1	T	0.3	0.1
2, 3-Dimethyl pentane		1	1	0.2	0.1
2-Methyl hexane	1	3	3	1.5	1
3-Metoyl hexane			3	1	1
3-Ethyl pentane			T	0.1	0.1
n-Heptane	2		9	4	5
2, 2, 4-Trimethyl pentane				T	T
Methyl cyclohexane	11	10	7	14	17
1, 2-Dimethyl cyclopentane	2	2	1	0.1	1.5
Toluene	14	6	7	6	5.5
2, 2, 3-Trimethyl pentane				T	T
2, 3, 4-Trimethyl pentane				T	T
1, 1-Dimethyl cyclohexane				0.5	1
1, 3-Dimethyl cyclohexane	4	4	2	3.5	7
1, 4-Dimethyl cyclohexane	2	4	2	2.5	5
1, 2-Dimethyl cyclohexane		3	2	1.5	5
n-Octane	3		3	3	2
Ethyl benzene	1	1	1	2	1
p-Xylene	2	2	2	2	2
m-Xylene	6	7	5	6	5
o-Xylene	1	4	2	1.5	2
n-Nonane				2	0.5

† T means "trace"

* *Seria and Miri gasolines were analysed more carefully than the other three.*

(1) As to new data of the Raman spectra of pure *n*-hydrocarbons see Mizushima and Simanouti: J. Am. Chem. Soc. **71** (1949), 1320.

amount to $70 \sim 80$ per cent of the original gasolines. The remaining $30 \sim 20$ per cent corresponds to the hydrocarbons whose Raman spectra have not been reported.

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