

This investigation thus allowed us to extend our knowledge of the mechanism of the isomerisation of saturated hydrocarbons in the presence of aluminium chloride; the experimental results confirm the hypothesis that this process includes as one of its first stages dehydrogenation with the production of hydrogen.

The mechanism established by the above-mentioned experiments⁴⁸⁾ has also been confirmed by an investigation of the isomerisation of n-hexane in presence of aluminium chloride⁵⁰⁾. Also in this case the isomerisation reaction is abruptly inhibited by a pressure of hydrogen.

Thus it appears that high pressure methods could find wide application in the investigation of heterogeneous catalytic reactions. In a paper mentioned above²³⁾ an account is given of the effect of high pressure on the presence of an aluminosilicate catalyst. In this paper the following data were given:

Temperature (°C)	410	410	420	420
Average pressure of n-heptane (atm.)	350	820	450	1100
Yield in wt.-% of charge:				
(a) Of unchanged n-heptane,	54.5	37.4	35.0	20.9
(b) Of gaseous and liquid products boiling below 48°C.	31.8	45.3	51.1	64.5

As seen from the above data, the catalytic cracking of n-heptane is accelerated by high pressure. At the same time the thermal cracking of n-heptane is retarded by high pressure (see above). Thus the results obtained reflect the essential difference between thermal and catalytic processes; they confirm the fact that the rate-determining step in catalytic cracking is adsorption or some sort of reaction of the hydrocarbon with the catalyst, whence an acceleration of the process in question by increased pressure is to be expected.

We may mention in closing that high pressure can also be useful in studying the catalysts themselves. This is borne out by the results of investigations of catalysed chemical reactions at various pressures (a survey of such investigations is given in ref. 3).

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