

Physical constants of purified n-heptane:  $d_4^{20}$  0.6832;  $n_D^{20}$  1.3879; according to the literature  $d_4^{20}$  0.68376;  $n_D^{20}$  1.38764; b.pt 98.1-98.4°C (760 mm).

The reaction products were distilled in a rectifying column of the above-mentioned efficiency.

For the catalytic cracking experiments aluminosilicate catalyst was used, which was heated before the experiment at 500°C in a current of air for 3 hours. For the results of these experiments we refer to tables 1 and 2.

TABLE 1

Cracking of n-heptane ( $\tau = 3$  hours)

| No.<br>Exp.                                 | Quantity of<br>n-heptane, g | Temp.<br>°C | P,<br>atm. | Yield of liquid<br>products | Including      |        |        |         | Gas and liquid<br>products with<br>b.pt < 48°C<br>(by difference) | 20<br>n <sub>D</sub><br>res. | $\frac{> C_7}{< C_7}$<br>*** |
|---------------------------------------------|-----------------------------|-------------|------------|-----------------------------|----------------|--------|--------|---------|-------------------------------------------------------------------|------------------------------|------------------------------|
|                                             |                             |             |            |                             | 48-76°         | 76-96° | 96-99° | residue |                                                                   |                              |                              |
|                                             |                             |             |            |                             | in % on feed * |        |        |         |                                                                   |                              |                              |
| a) Thermal (under n-heptane pressure)       |                             |             |            |                             |                |        |        |         |                                                                   |                              |                              |
| 14                                          | 35.45                       | 420         | 480-760    | 68.3                        | 5.2            | 4.2    | 19.7   | 30.1    | 40.8                                                              | 1.4512                       | 0.65                         |
| 31                                          | 40.5                        | 420         | 750-1120   | 78.9                        | 4.7            | 3.7    | 28.6   | 32.0    | 31.0                                                              | 1.4480                       | 0.90                         |
| 13                                          | 41.0                        | 420         | 1000-1300  | 88.5                        | 3.2            | 3.4    | 39.8   | 33.1    | 20.5                                                              | 1.4370                       | 1.40                         |
| 12                                          | 45.0                        | 420         | 1750-1980  | 94.2                        | 2.1            | 1.9    | 55.6   | 26.5    | 12.9                                                              | 1.4262                       | 1.77                         |
| 11                                          | 49.0                        | 420         | 3100       | 96.7                        | 1.4            | 2.1    | 59.3   | 27.0    | 10.2                                                              | 1.4262                       | 2.33                         |
| 48                                          | 40.0                        | 415         | 100-170    | 75.3                        | 3.6            | 3.3    | 33.3   | 22.11   | 37.7                                                              | 1.4556                       | 0.54                         |
| b) Under hydrogen pressure                  |                             |             |            |                             |                |        |        |         |                                                                   |                              |                              |
| 40                                          | 40.0                        | 415         | 350        | 94.0                        | 1.0            | 2.5    | 71.8   | 4.2     | 20.5                                                              | 1.4050                       |                              |
| 39                                          | 40.0                        | 415         | 740        | 87.7                        | 1.4            | 3.0    | 65.1   | 3.0     | 27.5                                                              | 1.4006                       |                              |
| 38                                          | 40.0                        | 415         | 1200       | 78.2                        | 1.8            | 1.3    | 52.2   | 6.2     | 38.5                                                              | 1.3920                       |                              |
| c) Catalytic *** (under n-heptane pressure) |                             |             |            |                             |                |        |        |         |                                                                   |                              |                              |
| 52                                          | 30.0                        | 420         | 330-550    | 62.4                        | 2.4            | 4.8    | 35.0   | 6.6     | 51.1                                                              | 1.4725                       |                              |
| 49                                          | 38.5                        | 420         | 950-1250   | 47.8                        | 2.9            | 4.8    | 20.9   | 6.9     | 64.5                                                              | 1.4712                       |                              |
| 54                                          | 30.0                        | 410         | 300-400    | 85.7                        | 2.4            | 5.7    | 54.5   | 6.6     | 31.8                                                              | 1.4281                       |                              |
| 57                                          | 30.0                        | 410         | 300-400    | 82.0                        | 1.4            | 4.9    | 49.3   | 11.3    | 33.1                                                              | 1.4112                       |                              |
| 55                                          | 35.0                        | 410         | 520-850    | 69.0                        | 2.9            | 6.5    | 30.6   | 14.9    | 45.1                                                              | 1.4236                       |                              |
| 56                                          | 39.4                        | 410         | 650-980    | 70.2                        | 2.9            | 6.5    | 37.4   | 7.9     | 45.3                                                              | 1.4480                       |                              |
| 46                                          | 40.0                        | 415         | 100-190    | 69.3                        | 1.8            | 3.5    | 42.8   | 5.3     | 46.6                                                              | 1.4625                       |                              |
| d) Catalytic under hydrogen pressure        |                             |             |            |                             |                |        |        |         |                                                                   |                              |                              |
| 43                                          | 40.0                        | 415         | 290        | 72.2                        | 1.8            | 4.8    | 45.5   | 3.6     | 44.3                                                              | 1.4358                       |                              |
| 42                                          | 40.0                        | 415         | 770        | 57.9                        | 2.3            | 5.5    | 29.6   | 7.5     | 55.1                                                              | 1.4032                       |                              |
| 44                                          | 40.0                        | 415         | 1240       | 51.7                        | 1.6            | 5.5    | 29.4   | 5.3     | 61.2                                                              | 1.3937                       |                              |

\* Allowing for a loss of 2 g when filling the reactors.

\*\* In the presence of 30% wt aluminosilicate catalyst. In this investigation the pressure was not raised to above 1250 atm. to keep the ratio catalyst/n-heptane accurately constant when the n-heptane in the reactor is vibrated.

\*\*\* > C<sub>7</sub> fraction with b.pt upwards of 99°C; < C<sub>7</sub> products with b.pt lower than 76°C.