

The Arrhenius equation:

$$\frac{d \ln k}{dT} = \frac{E_a}{RT^2}$$

can be used with the data from experiments 71, 91 and 80 to evaluate the variation of the rate constants with temperature, and to calculate the Arrhenius apparent energy of activation (E_a).

Figure 7 is a plot of the Arrhenius equation using data from experiments nos. 70, 71, 91, 80, and 81. The pressure (2000 psi) and the time (2 hours) were common to all experiments. The temperatures are 535°C, 605°C, 735°C, 790°C, and 870°C respectively. The apparent activation energy is calculated from the linear portion of the plot.

The Arrhenius equation: $d \ln k/dT = E_a/RT^2$, because E_a is constant,

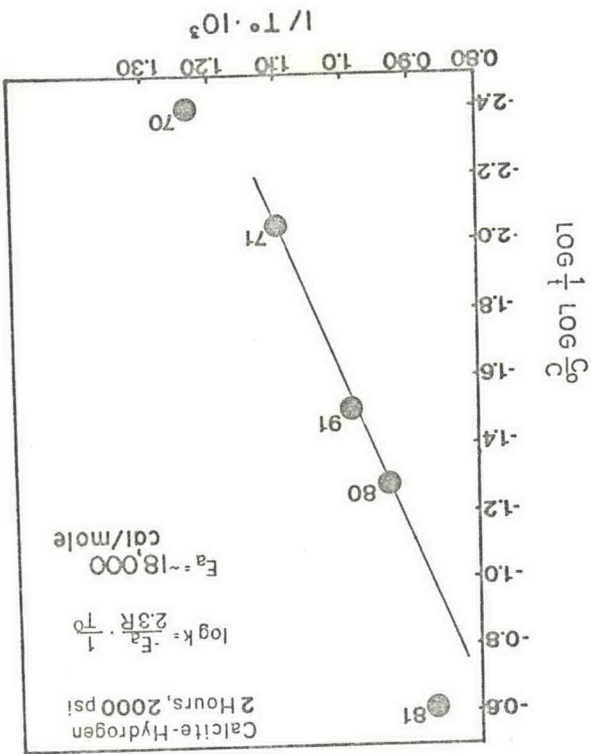


Fig. 7. Plot of $\log(1/T \log C)$ or $\log k$ against the reciprocal of the absolute temperature for experiments numbered 70, 71, 91, 80, and 81. These experiments were run at 2000 psi (H_2); 2 hours, at 535, 605, 735, 790, and 870°C respectively. The Arrhenius activation energy calculated from the slope of experiments 71, 91, and 80 is 23,000 cal/mole.

RESIDUAL
WT %
CO₂

29

33

37

41

SI

71

generated and residual
(H_2) exp. no. 77, 79 and

ours respectively is
excessive, and the
same experiments is

$P(H_2)$

k (hour⁻¹)

0.019
0.016
0.018
0.015
an = 0.017