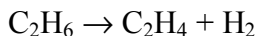


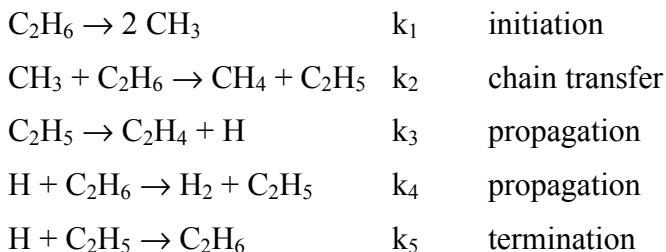
Chem 402—Physical Chemistry
Homework Problem Set—Chapter 23

Due Thursday, Feb. 21, 2008

1. At elevated temperatures, ethane can dissociate into ethene and hydrogen:



A proposed mechanism for this process is:



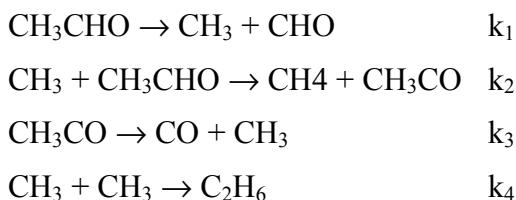
Apply the steady state approximation to the CH_3 , C_2H_5 , and H intermediates and determine an expression for the loss of ethane.

2. Consider the reaction mechanism



(a) Write expressions for the net rate of change of each species. (b) Assume $[\text{M}]$ is small; obtain rate equations for the removal of A and formation of C . (c) What relative values of rate coefficients would result in the reaction being 1st order with respect to A ? What values would the reaction be 2nd order with respect to A ?

3. The mechanism for pyrolysis of acetaldehyde at 520 °C and 0.2 bar is:



What is the rate law for reaction of acetaldehyde?