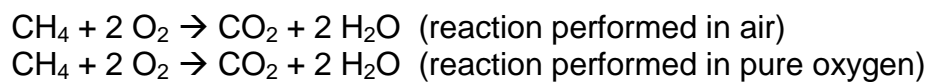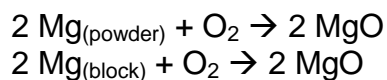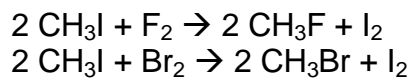# Kinetics Review Sheet

This review sheet is excellent preparation for your kinetics quiz. In addition to this sheet, you should be familiar with your class notes and homework in order to do well on your quiz.

1)   Define the following vocabulary terms:

- collision theory:

- activation energy:

- homogeneous catalyst:

- specific rate constant:

- reaction order:

- instantaneous reaction rate:

- rate determining step:

2)   In the reaction $C_2H_2 + H_2 \rightarrow C_2H_4$, the initial concentration of C_2H_2 was 0.10 M. Fifteen seconds later, the concentration of C_2H_2 was measured to be 0.04 M. Using this information, what was the average reaction rate during the first fifteen seconds of the reaction?

3)   Sketch the energy diagram for an endothermic reaction, labeling the following features: products, reactants, activation energy, transition state, heat of reaction. Also show what the addition of a catalyst would do to this energy diagram.

4)   Explain whether the following statement is true or false: Exothermic reactions are faster than endothermic reactions.

5)   Which reaction in each pair of reactions will proceed most quickly? Explain
        your answer.

        $2\ CH_3I + F_2 \rightarrow 2\ CH_3F + I_2$
        $2\ CH_3I + Br_2 \rightarrow 2\ CH_3Br + I_2$

        $2\ Mg_{(powder)} + O_2 \rightarrow 2\ MgO$
        $2\ Mg_{(block)} + O_2 \rightarrow 2\ MgO$

        $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$ (reaction performed in air)
        $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$ (reaction performed in pure oxygen)

6)   The following experimental data were obtained from the reaction A + B $\rightarrow$ C:

experiment	[A] (M)	[B] (M)	reaction rate (M/sec)
1	0.10	0.10	4.0×10^{-4}
2	0.10	0.20	16.0×10^{-4}
3	0.20	0.10	8.0×10^{-4}

        a)   Use these data to write the rate law for this reaction.

        b)   What is the order of this reaction in A, B, and overall?

        c)   Using the rate law you have come up with, determine the rate constant
                for this reaction.

        d)   What is the instantaneous reaction rate for this reaction when [A] =
                0.05 M and [B] = 0.05 M?

7)   What is the main factor in determining the reaction rate?