

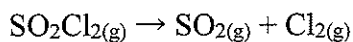
Name _____
Rate Constants/ Determination of Rates

1. (Brady580) What is the rate of the reaction below at 0C when the reactant concentrations are the following: $[H_2SeO_3] = 2.0E-2M$, $[I^-] = 2.0E-3M$, $[H^+] = 1.0E-3M$?



$5.0E5 (2.0E-2)^1 (2.0E-3)^3 (1.0E-3)^2 = 8.0E-11 \frac{mol}{Ls}$

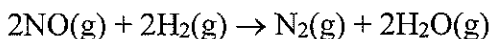
2. (Brady584) Sulfuryl Chloride, SO_2Cl_2 , is used to manufacture the antiseptic Chlorophenol. The following data were collected on the decomposition of SO_2Cl_2 , at a constant temperature. The experiment is tracking the production of SO_2 production. Determine rate equation, rate constant, and the units for the rate constant.



SO_2Cl_2 M	SO_2 M/s
0.100	2.2E-6
0.200	4.4E-6
0.300	6.6E-6

$Rate = k[SO_2Cl_2]$
 $Rate = k[.1]$
 $2.2E-6 = k[.1]$
 $k = 2.2E-7 \frac{1}{sec}$

3. (Brady585) The following data was measured for the reduction of nitric oxide with hydrogen. Determine the rate law of the reaction.



Experiment	[NO]	[H ₂]	Rate of formation of H ₂ O
1	0.10	0.10	1.23E-3 Mol/L s
2	0.10	0.20	2.46 E-3 mol/L s
3	0.20	0.10	4.92E -3 mol/L s

$Rate = k [NO]^2 [H_2]^1$

4. (Kotz698) The rate of the reaction between CO and NO_2 ($CO + NO_2 \rightarrow CO_2 + NO$) was studied at 540K starting with various concentrations of CO and NO_2 and Data in the table were collected. Determine the rate equation from these data. What is the value of the rate constant?

Experiment	[CO] M	[NO ₂] M	Initial rate mol/L h
1	5.10E-4	0.350E-4	3.4E-8
2	5.10E-4	0.700E-4	6.8E-8
3	5.10E-4	0.185E-4	1.7E-8
4	1.02E-3	0.350E-4	6.8E-8
5	1.53E-3	0.350E-4	10.2E-8

$Rate = k [CO]^0 [O_2]^1$
 $3.4E-8 = k [0.35E-4]^1$
 $k = 9.7E-4 \frac{1}{h}$