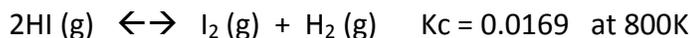


AP Chemistry Midterm Review

- 47.0 grams of sodium hydroxide reacts with 47.0 g of hydrochloric acid.
 - Write a balanced chemical equation for the reaction.(not net ionic)
 - What is the limiting reactant?
 - What is the theoretical yield in grams of sodium chloride?
 - If 63.5 grams of sodium chloride are produced in the lab, what is the percent yield?
- Calculate the molar solubility of SrF_2 in each of the following solutions.
 K_{sp} of $\text{SrF}_2 = 7.9 \times 10^{-10}$
 - pure water
 - 0.100 M SrNO_3
 - 0.200 M NaF

- At 800K hydrogen iodide can decompose into hydrogen and iodine gases:



If initially a sealed 1.00L flask at 800K contains only 0.00305 mol of HI,

- What is the initial partial pressure of HI in the flask?
 - What are the molarities at equilibrium of the hydrogen and iodine gases?
 - What is the total pressure in the flask at equilibrium?
 - What are the total moles in the flask at equilibrium?
- The equation for the reaction between iodide and bromate ions in acidic solution is
 $6\text{I}^-(\text{aq}) + \text{BrO}_3^-(\text{aq}) + 6\text{H}^+(\text{aq}) \rightarrow 3\text{I}_2(\text{aq}) + \text{Br}^-(\text{aq}) + 3\text{H}_2\text{O}(\text{l})$

Experiment	Initial $[\text{I}^-]$ (mol L^{-1})	Initial $[\text{BrO}_3^-]$ (mol L^{-1})	Initial $[\text{H}^+]$ (mol L^{-1})	Rate of Disappearance of BrO_3^- ($\text{mol L}^{-1} \text{s}^{-1}$)
1	0.0020	0.0080	0.020	8.89×10^{-5}
2	0.0040	0.0080	0.020	1.78×10^{-4}
3	0.0020	0.0160	0.020	1.78×10^{-4}
4	0.0020	0.0080	0.040	3.56×10^{-4}
5	0.0015	0.0040	0.030	7.51×10^{-5}

- Determine the order of the reaction for each reactant listed below.
(show your work or explain your reasoning)
 - I^-
 - BrO_3^-
 - H^+
- Write the rate law for the reaction.
- Calculate the value of the rate constant, k , for the reaction. *Include the units.*
- What is the rate of formation of I_2 for experiment 4 if the rate is based upon the disappearance of BrO_3^- ?



- (A) Balance the above redox reaction in acidic solution.
 (B) What species is being oxidized? What species is being reduced?
 (C) What mass of CuS (s) is needed to react completely with 10.5 mL of 2.00 M KNO₃ solution?

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Important things to review/remember...not a complete list, but pretty close to it...

- | | |
|--|---|
| a. Significant figures | v. Reaction mechanisms: how to identify catalyst and intermediate |
| b. Polyatomic ions | w. Rate constant (k) units |
| c. Solubility rules | x. Ideal gas law |
| d. Naming rules | y. Conditions to make a gas behave more ideally |
| e. Strong acids and bases | z. Relationship between pressure, volume, temperature, and number of moles of a gas |
| f. Diatomic molecules | aa. Equilibrium definition and writing K _c and K _p expressions |
| g. Alkanes and alkyls | bb. Formula for converting between K _c and K _p |
| h. Amines | cc. Le Chatelier's principle and shifts |
| i. Mole, gram, particles conversions | dd. Manipulating K values: reversing equations, multiplying by coefficients, adding equations to get overall equation |
| j. Percent composition, empirical and molecular formulas | ee. Common ion effect and its effect on molar solubility |
| k. Percent yield and percent error | ff. How to determine if a precipitate will form |
| l. Molarity formula and finding moles from concentration and volume | gg. Acid/Base definitions and ionization equations |
| m. Dilution formula | hh. pH, pOH, [H ⁺], [OH ⁻], K _w formulas |
| n. Net ionic equations | ii. How to determine if a salt is acidic, basic, or neutral |
| o. Oxidation numbers and redox | jj. ICE problems: K _c , K _p , K _{sp} , K _a , and K _b |
| p. Two requirements for an "effective" collision | |
| q. Factors that increase reaction rate | |
| r. Graphs for zero, first, and second order reactants | |
| s. Effect of changing concentration of 1 st and 2 nd order reactants | |
| t. Reaction path diagrams: identifying reactants, products, activated complex, and activation energy | |
| u. Endothermic vs. exothermic | |

What did the chemist say when he found two isotopes of helium???

HeHe. 😊