

KEY

Unit 9 Outline- Thermodynamics, Reaction Rates, & Chemical Equilibrium Chapters 17 & 18

Essential Skills/ State Standards:

- 9-1. Describe how temperature and heat flow in terms of the motion of molecules (or atoms). (CSS: 7a)
 9-2. Know that chemical processes & phase changes can either release energy (exothermic) or absorb energy (endothermic). (CSS: 7b, 7c)
 9-3. Solve problems involving heat flow and temperature changes, using known values of specific heat ($q = m \cdot c \cdot \Delta T$) & latent heat of phase change ($q = m \cdot \Delta H$). (CSS: 7d)
 9-4. Know the rate of reaction is the decrease in concentration of reactants or the increase in concentration of products with time & depends on such factors as: concentration, temperature, and pressure. (CSS: 8a, 8b)
 9-5. Know the definition and role of activation energy & catalyst in a chemical reaction. (CSS: 8d*, 8c)
 9-6. Know how to use Le Chatelier's principle to predict the effect of changes in concentration, temperature, and pressure. (CSS: 9a)
 9-7. Know that equilibrium is established when the forward and reverse reaction rates are equal. (CSS: 9b)

Vocabulary

- | | | | |
|----------------|-------------------|--|---------------------------|
| • Condensation | • Deposition | • Calorimeter | • Heat of reaction |
| • Freezing | • Heat | • Joule | • Le Chatlier's principle |
| • Vaporization | • Temperature | • Specific heat | • Equilibrium |
| • Melting | • Thermochemistry | • $q = m \cdot c \cdot \Delta T$ | • Activation Energy |
| • Boiling | • Exothermic | • $q = m \cdot \Delta H_{\text{vaporization}}$ | • Catalyst |
| • Sublimation | • Endothermic | • $q = m \cdot \Delta H_{\text{fusion}}$ | |

Study Guide (Use notes, worksheets, and labs in addition to this study guide)

1. According to the collision theory, what 3 things must happen in order for two molecules to react?

Must collide with each other, Must collide with enough energy, & in the correct orientation

2. What is the importance of the activation energy in a chemical reaction?

Amount of energy needed for a reaction to occur.

3. Using the collision theory, explain if the following would increase/ decrease the rate of reaction:

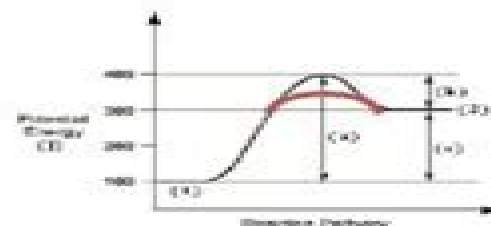


- Increase temp: *Increase, molecules collide more*
- Increase HCl: *Increase, more collisions because more reactants to collide*
- Increase pressure: *Hard to say, wouldn't affect the reactants directly because none of them are gases. One of the products is a gas, so it might cause the gas particles to collide more with the reactants and could slow it down. Tough call.. (this one won't be on the test).*
- Remove MgCl_2 : *Increase, less products means less chance for them to interfere with reactant collisions*
- Add H_2 : *Decrease, more products mean they interfere more with reactants and the reactants would collide less.*

4. Identify the following terms with their correct letter from the graphs:

- Reactants- **I**
- Products- **2**
- Activation energy (number/ letter & amount)-
A (300 Joules)
- Is this reaction exothermic or endothermic?
Endothermic

5. Explain how a catalyst affects the activation energy in a chemical reaction. (Also, show on the above graph what a catalyst might do). It lowers the activation energy (see on graph).
Speeds it up by lowering the activation energy.



Reaction Rates And Equilibrium Test And Answers

S Nieto



Reaction Rates And Equilibrium Test And Answers:

Solutions of Reaction Rate Equations Pertaining to Electron Irradiation of 4:1 Mixtures of N₂ and O₂

Frankline E. Niles, Edna L. Lortie, 1967 One of the Keneshea computer codes see AD 424 173 was adapted for use on the Ballistic Research Laboratories Electronic Scientific Computer Using this modified code reaction rate equations were solved for the following 15 species e NO₂ O O₂ O₃ N₂ NO O O₂ N NO N₂O NO₂ O and O₃ The calculations were made for a 4:1 mixture of N₂ and O₂ at 1 torr total pressure and 300K Rate constants as given by Keneshea and Fowler see AD 646 975 were used The solutions are presented as number densities versus time after the start of the irradiating electron beam A description of the modified code is presented Author

Laboratory Manual for Principles of General Chemistry J. A. Beran, Mark Lassiter, 2022-08-16 Laboratory Manual for Principles of General Chemistry 11th Edition covers two semesters of a general chemistry laboratory program The material focuses on the lab experiences that reinforce the concepts that not all experimental conclusions are the same and depend on identifying an appropriate experimental procedure selecting the proper apparatus employing the proper techniques systematically analyzing and interpreting the data and minimizing inherent variables As a result of good data a scientific and analytical conclusion is made which may or may not be right but is certainly consistent with the data Experiments write textbooks textbooks don't write experiments A student's scientific literacy grows when experiences and observations associated with the scientific method are encountered Further experimentation provides additional cause effect observations leading to an even better understanding of the experiment The 11th edition's experiments are informative and challenging while offering a solid foundation for technique safety and experimental procedure The reporting and analysis of the data and the pre and post lab questions focus on the intuitiveness of the experiment The experiments may accompany any general chemistry textbook and are compiled at the beginning of each curricular unit An Additional Notes column is included in each experiment's Report Sheet to provide a space for recording observations and data during the experiment Continued emphasis on handling data is supported by the Data Analysis section

SAT Subject Test Chemistry Joseph A. Mascetta, Mark Kernion, 2020-12-01 Note College Board has discontinued the SAT Subject Tests in the US The tests will be available outside the US in June 2021 and then be discontinued Barron's SAT Subject Test Chemistry with 7 Practice Tests features in depth review of all topics on the exam and full length practice tests in the book and online This edition includes One full length diagnostic test to help you assess your strengths and weaknesses Comprehensive review of all topics on the exam including introductory chemistry atomic structure and the periodic table bonding chemical formulas gases and laws stoichiometry liquids solids and phase changes chemical reactions and thermochemistry chemical reactions chemical equilibrium acids bases and salts oxidation reduction carbon and organic chemistry and the laboratory Four full length practice tests that reflect the actual SAT Subject Test Chemistry exam in length question types and degree of difficulty Two full length online practice tests with answer

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more than you i know how hard you work and i know you deserve the prize

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