

Assignment 10: Fluoroborates

1. Draw the structural formulae of compounds (a)-(f):



Structure of $\text{BF}_3 \cdot \text{O}(\text{C}_2\text{H}_5)_2$



2. A gas-phase ion-molecule study is carried out with BF_3 and gaseous ether. The study shows that the ionization of BF_3 is a facile ionization process. Calculate the bond dissociation energy of BF_3 (in kJ/mol) from the following data: $\text{BF}_3 \rightarrow \text{BF}_2 + \text{F}$ (kJ/mol) = 640, $\text{BF}_3 \rightarrow \text{BF} + \text{F}_2$ (kJ/mol) = 1000.

3. A gas-phase ion-molecule study is carried out with BF_3 and gaseous ether. The study shows that the ionization of BF_3 is a facile ionization process. Calculate the bond dissociation energy of BF_3 (in kJ/mol) from the following data: $\text{BF}_3 \rightarrow \text{BF}_2 + \text{F}$ (kJ/mol) = 640, $\text{BF}_3 \rightarrow \text{BF} + \text{F}_2$ (kJ/mol) = 1000.

Answer: 640 kJ/mol

4. When a gas-phase ion-molecule study is carried out with BF_3 and gaseous ether, the ionization of BF_3 is a facile ionization process. Calculate the bond dissociation energy of BF_3 (in kJ/mol) from the following data: $\text{BF}_3 \rightarrow \text{BF}_2 + \text{F}$ (kJ/mol) = 640, $\text{BF}_3 \rightarrow \text{BF} + \text{F}_2$ (kJ/mol) = 1000.

5. The gas-phase ion-molecule study of BF_3 shows that the ionization of BF_3 is a facile ionization process. Calculate the bond dissociation energy of BF_3 (in kJ/mol) from the following data: $\text{BF}_3 \rightarrow \text{BF}_2 + \text{F}$ (kJ/mol) = 640, $\text{BF}_3 \rightarrow \text{BF} + \text{F}_2$ (kJ/mol) = 1000.

6. Draw the structural formulae of compounds (a)-(f) and calculate the bond dissociation energy of BF_3 (in kJ/mol) from the following data: $\text{BF}_3 \rightarrow \text{BF}_2 + \text{F}$ (kJ/mol) = 640, $\text{BF}_3 \rightarrow \text{BF} + \text{F}_2$ (kJ/mol) = 1000.



7. A gas-phase ion-molecule study is carried out with BF_3 and gaseous ether. The study shows that the ionization of BF_3 is a facile ionization process. Calculate the bond dissociation energy of BF_3 (in kJ/mol) from the following data: $\text{BF}_3 \rightarrow \text{BF}_2 + \text{F}$ (kJ/mol) = 640, $\text{BF}_3 \rightarrow \text{BF} + \text{F}_2$ (kJ/mol) = 1000.

8. By ionization, the bond dissociation energy of BF_3 is calculated to be 640 kJ/mol. Calculate the bond dissociation energy of BF_3 (in kJ/mol) from the following data: $\text{BF}_3 \rightarrow \text{BF}_2 + \text{F}$ (kJ/mol) = 640, $\text{BF}_3 \rightarrow \text{BF} + \text{F}_2$ (kJ/mol) = 1000.

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Wilhelm Ostwald



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Metallurgical Calculations: Introduction, Chemical and thermal principles, problems in combustion Joseph William Richards, 1906

Survival Guide to General Chemistry Patrick E. McMahon, Rosemary McMahon, Bohdan Khomtchouk, 2019-02-13 This work evolved over thirty combined years of teaching general chemistry to a variety of student demographics The focus is not to recap or review the theoretical concepts well described in the available texts Instead the topics and descriptions in this book make available specific detailed step by step methods and procedures for solving the major types of problems in general chemistry Explanations instructional process sequences solved examples and completely solved practice problems are greatly expanded containing significantly more detail than can usually be devoted to in a comprehensive text Many chapters also provide alternative viewpoints as an aid to understanding Key Features The authors have included every major topic in the first semester of general chemistry and most major topics from the second semester Each is written in a specific and detailed step by step process for problem solving whether mathematical or conceptual Each topic has greatly expanded examples and

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Thermochemical Calculations Ralph Richter Wenner,1941 *Metallurgical Calculations* Joseph William Richards,1910

Predicting Radiative Heat Transfer in Thermochemical Nonequilibrium Flow Fields Lin Hartung Chambers,1994 Abstract The theory for radiation emission absorption and transfer in a thermochemical nonequilibrium flow is presented The expression developed reduce correctly to the limit at equilibrium To implement the theory in a practical computer code some approximations are used particularly the smearing of molecular radiation Details of these approximations are presented and helpful information is included concerning the use of the computer code This user s manual should benefit both occasional users of the Langley Optimized RAdiative Nonequilibrium LORAN code and those who wish to use it to experiment with improved models or properties

A Text Book of Thermo-chemistry and Thermodynamics Otto Sackur,1917

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Thermochemical IR Sources Steven M. Miller, 1994 **Energetics of Stable Molecules and Reactive Intermediates** M.E. Minas da Piedade, 2012-12-06 Covers the major experimental and theoretical methods currently used to study the energetics of stable molecules and reactive intermediates Reviews the state of the art and shows the interplay of experimental and theoretical methods used to probe bonding energetics and reactivity and a wide range of chemical species A modern and invaluable introduction to the study of molecular energetics A reference for workers currently involved in the field

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F. Barry, 2004-07-21 The bible of gas chromatography offering everything the professional and the novice need to know about running maintaining and interpreting the results from GC Analytical chemists technicians and scientists in allied disciplines have come to regard Modern Practice of Gas Chromatography as the standard reference in gas chromatography In addition to serving as an invaluable reference for the experienced practitioner this bestselling work provides the beginner with a solid understanding of gas chromatographic theory and basic techniques This new Fourth Edition incorporates the most recent developments in the field including entirely new chapters on gas chromatography mass spectrometry GC MS optimization of separations and computer assistance high speed or fast gas chromatography mobile phase requirements gas system requirements and sample preparation techniques qualitative and quantitative analysis by GC updated information on detectors validation and QA QC of chromatographic methods and useful hints for good gas chromatography As in previous editions contributing authors have been chosen for their expertise and active participation in their respective areas Modern Practice of Gas Chromatography Fourth Edition presents a well rounded and comprehensive overview of the current state of this important technology providing a practical reference that will greatly appeal to both experienced chromatographers and novices

Progress in Thermochemical Biomass Conversion A. V. Bridgwater, 2008-04-30 This book is for chemical engineers fuel technologists agricultural engineers and chemists in the world wide energy industry and in academic research and government institutions It provides a thorough review of and entry to the primary and review literature surrounding the subject The authors are internationally recognised experts in their field and combine to provide both commercial relevance and academic rigour Contributions are based on papers delivered to the Fifth International Conference sponsored by the IEA Bioenergy Agreement

Laboratory Study of the Thermochemical Properties of Materials Used in Spacecraft Terry L. Thiem, 1990 A high temperature mass spectrometer used to obtain laboratory data on the thermochemical properties of materials encountered in space research is described in detail The experimental procedures and data analysis necessary to obtain thermochemical constants from the mass spectrometer data are also described The present experimental arrangement allows cell temperatures of up to 2100 K Reliable measurements at signal levels below 10 ion counts s can be made because of the very low background signal and the entirely automated data acquisition and averaging system In preliminary studies of osmium and its oxides it is shown that the choice of molybdenum as the cell material is detrimental The use of an alumina Knudsen cell is proposed

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