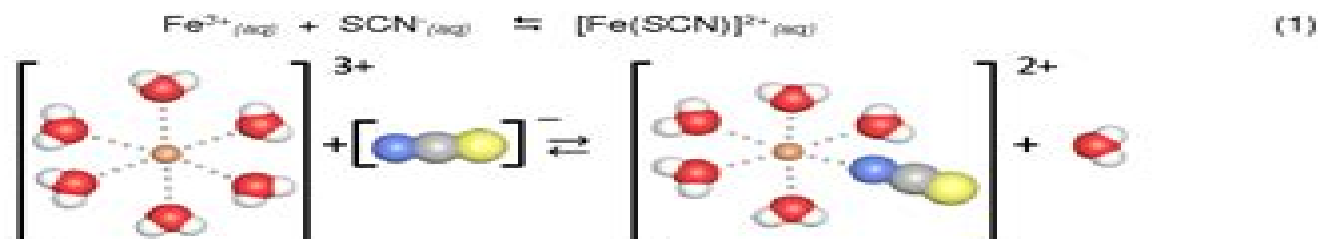


Determining an Equilibrium Constant

Introduction

The equilibrium relationship we are studying in this lab is the aqueous reaction between iron(III) and the thiocyanate ion. The net ionic equation and chemistry are:



The equilibrium constant expression is:

$$K_c = \frac{[\text{Fe}(\text{SCN})^{2+}]}{[\text{Fe}^{3+}][\text{SCN}^{-}]} \quad (2)$$

This experiment uses a Spec-200 spectrophotometer to measure the molar concentration of $[\text{Fe}(\text{SCN})]^{2+}_{(aq)}$, and the instrument needs to be calibrated before data collection. You will use your Spec-200 instrument to measure absorption data for a series of solutions of known $[\text{Fe}(\text{SCN})]^{2+}_{(aq)}$ concentration. This should give you a linear plot of the absorbance with respect to the $[\text{Fe}(\text{SCN})]^{2+}_{(aq)}$ concentration in accord with Beer's Law. An explanation of spectrophotometry and Beer's law is included in this lab as Appendix 1.

The solutions of known $[\text{Fe}(\text{SCN})]^{2+}_{(aq)}$ concentration provided to you are prepared using Le Chatelier's principle—we put a known amount of $\text{SCN}^{-}_{(aq)}$ in solution, and then added a very large excess of $\text{Fe}^{3+}_{(aq)}$ to the solution, forcing the equilibrium to essentially favor quantitative production of $[\text{Fe}(\text{SCN})]^{2+}$.

Procedure

Calibrating the Spec-200 for $[\text{Fe}(\text{SCN})]^{2+}$.

The procedure begins by calibrating the Spec-200 instruments for λ_{max} and the absorbance as a function of $[\text{Fe}(\text{SCN})]^{2+}$ concentration. We have done this procedure before for other labs.

1. Turn on the spectrophotometer and follow the on screen commands. When the spectrophotometer has finished initializing:
 - a. Press the enter key (↵) to select "SPEC 200E Modern Interface"
 - b. With the word "Application" Highlighted press the right arrow (→) three times to select the "Scan" Application
 - c. Press the down arrow (↓) twice to highlight "Low λ ." If the value is not set to 400 adjust it using the left and right arrow keys. If it is set to 400 press the down arrow to highlight "High λ ."
 - d. Use the left and right arrow keys to adjust this value to 700
 - e. Press the down arrow once to highlight "Next" and press enter. The spectrophotometer is now ready for use.
2. The "blank" for zeroing the spec-200 instrument will be DI water. The DI water should fill at least 2/3 of the cuvette with no bubbles. Use a plastic transfer pipet.
3. Insert the blank into the spectrophotometer and press the zero button (0.00). When the instrument finishes zeroing (the screen reads 0.00) remove the cuvette.

Kc Iron Thiocyanate Lab Report

Nuno A.G. Bandeira, Bartosz Tylkowski

Kc Iron Thiocyanate Lab Report:

The Iron(III) Thiocyanate Reaction Kevin C. de Berg, 2019-11-13 This Brief presents an historical investigation into the reaction between ferric ions and thiocyanate ions which has been viewed in different ways throughout the last two centuries Historically the reaction was used in chemical analysis and to highlight the nature of chemical reactions the laws of chemistry models and theories of chemistry chemical nomenclature mathematics and data analysis and instrumentation which are important ingredients of what one might call the nature of chemistry Using the history of the iron III thiocyanate reaction as a basis the book's main objective is to explore how chemistry develops its own knowledge base how it assesses the reliability of that base and how some important tools of the trade have been brought to bear on a chemical reaction to achieve understanding a worthwhile goal of any historical investigation

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Chemistry in the Laboratory Jo A. Beran, 1996 This updated and revised chemistry manual provides a well rounded understanding of concepts in the general chemistry laboratory Utilising visual aids experiments and equipment are explained and results and their pertinence discussed

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to the exam administered every May Features of the guide include review sections of the six big ideas that the new exam focuses on Fundamental building blocks Molecules and interactions Chemical reactions Reaction rates Thermodynamics Chemical equilibrium Every section includes review questions and answers Also included in the guide are two full length practice tests as well as a math review section and sixteen discrete laboratory exercises to prepare AP Chemistry students for the required laboratory experiments section on the exam *Cumulated Index Medicus* ,1969 **Dictionary Catalog of the Research Libraries of the New York Public Library, 1911-1971** New York Public Library. Research Libraries,1979

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