

# Experiment 5

## Determination of the Percentage of Ligands in $K_3[Fe(C_2O_4)_3] \cdot 3H_2O$

### OBJECTIVES

1. To standardise the potassium permanganate solution.
2. To determine the percentage of ligands in  $K_3[Fe(C_2O_4)_3] \cdot 3H_2O$ .

### INTRODUCTION

Standardisation of potassium permanganate ( $KMnO_4$ ) solution is carried out by titration against a standard solution of oxalic acid. Oxalic acid is a good primary standard because the compound is available in solid form, as  $H_2C_2O_4 \cdot 2H_2O$ , which can be prepared to a very high degree of purity and is not hygroscopic nor efflorescent.

The reaction is as follows:



### OVERALL REACTION

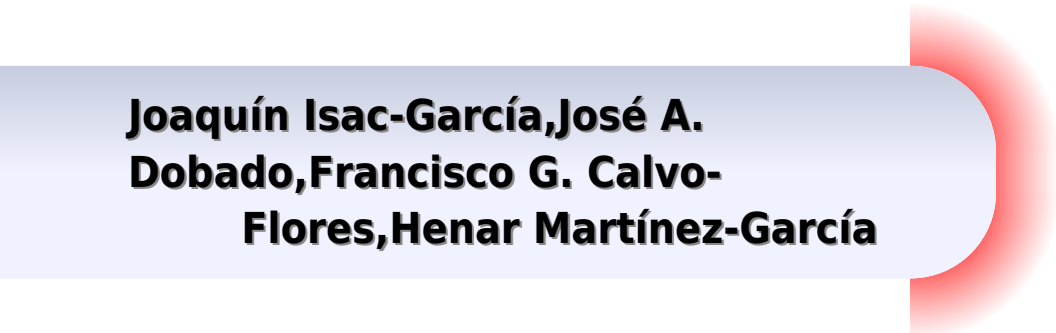


The following points about this reaction should be noted:

1. The reaction occurs only in acidic solutions. Acidification is achieved by the addition of sulfuric acid.
2. The reaction rate is normally slow. However, the reaction rate in this experiment is increased by (i) warming the contents of the conical flask or (ii) catalysed by the presence of manganese(II) ions, which is a product of the reaction.

# Chemistry Laboratory Manual Experiment 5

**Joaquín Isac-García, José A.  
Dobado, Francisco G. Calvo-  
Flores, Henar Martínez-García**



## **Chemistry Laboratory Manual Experiment 5:**

Guided Inquiry Experiments for General Chemistry Nancy K. Kerner, Ram S. Lamba, 2007-10-19 The use of the laboratory is a valuable tool in developing a deeper understanding of key chemical concepts from the experimental process This lab manual encourages scientific thinking enabling readers to conduct investigations in chemistry It shows how to think about the processes they are investigating rather than simply performing a laboratory experiment to the specifications set by the manual Each experiment begins with a problem scenario and ends with questions requiring feedback on the problem

**Experimental Organic Chemistry** Joaquín Isac-García, José A. Dobado, Francisco G. Calvo-Flores, Henar Martínez-García, 2015-10-30 Experimental Organic Chemistry Laboratory Manual is designed as a primer to initiate students in Organic Chemistry laboratory work Organic Chemistry is an eminently experimental science that is based on a well established theoretical framework where the basic aspects are well established but at the same time are under constant development Therefore it is essential for future professionals to develop a strong background in the laboratory as soon as possible forming good habits from the outset and developing the necessary skills to address the challenges of the experimental work This book is divided into three parts In the first safety issues in laboratories are addressed offering tips for keeping laboratory notebooks In the second the material the main basic laboratory procedures preparation of samples for different spectroscopic techniques Microscale Green Chemistry and qualitative organic analysis are described The third part consists of a collection of 84 experiments divided into 5 modules and arranged according to complexity The last two chapters are devoted to the practices at Microscale Synthesis and Green Chemistry seeking alternatives to traditional Organic Chemistry Organizes lab course coverage in a logical and useful way Features a valuable chapter on Green Chemistry Experiments Includes 84 experiments arranged according to increasing complexity *Environmental Chemistry* Jorge G. Ibanez, Margarita Hernandez-Esparza, Carmen Doria-Serrano, Arturo Fregoso-Infante, Mono Mohan Singh, 2011-05-06 Environmental issues are growing in importance to the most important political social legal and economic decisions The book presents chemical analyses of our most pressing waste pollution and resource problems for the undergraduate or graduate student The distinctive holistic approach provides a solid ground in theory as well as a laboratory manual detailing introductory and advanced experimental applications The laboratory procedures are presented at microscale conditions for minimum waste and maximum economy This work fulfills an urgent need for an introductory text in environmental chemistry combining theory and practice and is a valuable tool for preparing the next generation of environmental scientists **The United States Catalog**, 1925 Million Dollar Data: Building Confidence - Vol.1 Stephen DeMeo, 2020-07-31 Global warming our current and greatest challenge is without precedent Among the many consequences that are impacting our society one unanticipated concern involves scientific truth When the President of the United States and others in his administration declare that global warming is fake science it calls into question what real science is and what real school

science should be I will argue that real science is quality science one that is based on the rigorous collection of reliable and valid data To collect quality data requires bending over backwards to get things right and this is exactly what makes science so special Truth is made when scientists go this extra yard and devise controlled experiments collect large data sets confirm the data and rationally analyze their results Making scientific truth sounds difficult to do in the science laboratory but in reality there are many straightforward ways that truth can be constructed In the first of two volumes I discuss twelve such ways I call them Confidence Indicators that can allow students to strongly believe in their data and their subsequent results Many of these methods are intuitive and can be used by young students on the late elementary level all the way up to those taking introductory college science courses As in life science is not without doubt In the second volume I introduce the concept of scientific uncertainty and the indicators used to calculate its magnitude I will show that science is about connecting confidence with uncertainty in a specific manner what I refer to as the Confidence Uncertainty Continuum expression This important relationship epitomizes the scientific enterprise as a search for probabilistic rather than absolute truth This two volume set will contain a variety of ways that data quality can be instituted into a science curriculum To support its use many of the examples that I will present involve science teachers as well as student work and feedback from different grade levels and in different scientific disciplines Specific chapters will be devoted to reviewing the academic literature on data quality as well as describing my own personal research on this important but often neglected topic

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 **Cumulated Index to the Books**, 1906 A world list of books in the English language **Catalogue and Circular (1878/79, 1884/85 "Circular") of the Illinois Industrial**

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