

**Project for CHEM 362 Fall 2019**

**Prof. Kim R. Dunbar**

**Five page paper on one of the three topics listed below**

**(100 pts)**

**DUE DATE: Tuesday December 3<sup>rd</sup> (last day of class - redefined Thursday class)**

**PAPER WILL BE GRADED ON CONTENT, CLARITY AND COMPOSITION**

**1. Li ion batteries pertaining to the 2019 Nobel Prize in Chemistry**

John B. Goodenough

The University of Texas at Austin, USA

M. Stanley Whittingham

Binghamton University, State University of New York, USA

Akira Yoshino

Asahi Kasei Corporation, Tokyo, Japan

Meijo University, Nagoya, Japan

*"for the development of lithium-ion batteries"*

The Nobel Prize in Chemistry 2019 rewards the development of the lithium-ion battery. This lightweight, rechargeable and powerful battery is now used in everything from mobile phones to laptops and electric vehicles. It can also store significant amounts of energy from solar and wind power, making possible a fossil fuel-free society.

**2. Haber-Bosch pertaining to the 1918 Nobel Prize in Chemistry**

The Nobel Prize in Chemistry 1918 was awarded to Fritz Haber "for the synthesis of ammonia from its elements."

**3. Contributions and discoveries of Alfred Werner pertaining to the 1913 Nobel Prize in Chemistry**

The Nobel Prize in Chemistry 1913 was awarded to Alfred Werner "in recognition of his work on the linkage of atoms in molecules by which he has thrown new light on earlier investigations and opened up new fields of research especially in inorganic chemistry."

## OUTLINE FOR THE PAPER

Single spaced, 1 inch margins at top, bottom and sides

5 pages with Figures included.

The 5 pages does not include the Table of Contents or the references

FONT SIZE – 12 pt or 11 pt Times New Roman

I. TABLE OF CONTENTS (does not count as one of the five pages)  
This will be a list of the sections in your paper

II. INTRODUCTION WITH FIGURES

In this section you need to make sure the reader knows the importance of the topic of the research

Background – what was known about the topic before the discovery and why was it inadequate for addressing the issues in the chemistry?

Hypotheses – what did the scientist(s) state the scientific problem to be and what did he/they propose as a solution?

How were the hypotheses tested?

Challenges – what were the hurdles that had to be overcome in order to address the science?

Were there any failures in the methods and/or theories that were described by the Nobel Laureate(s) that led to the next steps which ultimately made his/their work successful?

III. MAJOR FINDINGS WITH FIGURES

Describe the main breakthroughs?

What did the person(s) actually discover that was not known before?

What methods and experiments did they use in their discoveries?

#### IV. DISCUSSION WITH FIGURES

Discuss the manner in which the data were interpreted and how the person(s) came to the conclusions that they ultimately made?

Discuss the importance of the findings in the context of the problem(s) that were being solved.

What was so important about the work that it merited being awarded a Nobel Prize?

What are any remaining challenges, if any, to understanding the topic of the Nobel Prize winning research?

#### V. REFERENCES (Use ACS style format – see examples below) (does not count as one of the five pages)

### Citation format

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#### Abbreviations

Titles of journals are abbreviated; e.g.:

- *J. Am. Chem. Soc.* – *Journal of the American Chemical Society*
- *J. Phys. Chem.* – *Journal of Physical Chemistry*
- *J. Phys. Chem. A* – *Journal of Physical Chemistry* (A, B, or C)
- *J. Org. Chem.* – *Journal of Organic Chemistry*
- *Org. Lett.* – *Organic Letters*
- *Phys. Rev. Lett.* – *Physical Review Letters*
- *Tetrahedron* – *Tetrahedron*
- *Tetrahedron Lett.* – *Tetrahedron Letters*
- *Acc. Chem. Res.* – *Accounts of Chemical Research*

## Journal Article

Last Name, First Initial.; Last Name, First Initial. "Title". *Journal*, **Year**, *Volume*, Pages.

NOTE: Journal abbreviation and volume are *italicized*. Year of publication is **bolded**.

### Example of a journal citation to follow in your paper

Deno, N. C.; Richey, H. G.; Liu, J. S.; Lincoln, D. N.; Turner, J. O. "Carbonium Ions. XIX. The Intense Conjugation in Cyclopropyl Carbonium Ions". *J. Am. Chem. Soc.*, **1965**, *87*, 4533-4538.

## Books and Book Chapters

The required information for a book is author or editor, book title, publisher, city of publication, and year of publication. **Omit words like "Company," "Inc.," "Publisher," and "Press" in publishers' names. Although not all ACS publications include the chapter title in book references, please include it.** Using the word "In" signifies the primary author(s) wrote only part of the book, not the entire book.

### Example of a book chapter to follow in your paper

Asmus, K. D. Recent Aspects of Thiyl and Perthiyl Free Radical Chemistry. In *Active Oxygens, Lipid Peroxides, and Antioxidants*; Yagi K., Ed.; Japan Scientific Societies: Tokyo; CRC: Boca Raton, FL, 1993; pp 57-67.