Element Presentation Assignment

The purpose of this assignment is to learn a great deal about the descriptive chemistry of a specific group of elements and have the opportunity to learn a little more about some of the other groups by listening to presentations. An 6 – 10 page paper will be written that will serve as the basis of a class presentation. Your paper will review the current state of knowledge on group of elements, including all the following topics:

- History of their discovery; including human aspects
- Isolation and Properties of the Elements
- Binary Chemistry, including oxidation states
- Compounds and Their Uses
- Current Research, a brief description of a single recent paper relevant to the synthetic chemistry of one or more of the elements

The paper and presentation should contain the information you feel is the most interesting and useful, both to you and your classmates. It will not be comprehensive, but it should be thorough.

Guidelines for preparing your paper and presentation follow:

**Paper**

1. **Outline**

   In two weeks, you will turn in an outline of your paper.

   First, and foremost, your outline will contain a bibliography of all references in ACS format (see *The ACS Style Guide, a Manual for Authors and Editors*; Dodd, J. S., Ed.; American Chemical Society: Washington, DC, 1997).

   Your bibliography will consist of at least three books, several websites, and one current (within the last year) *Inorganic Chemistry* article featuring at least one of your elements.

   **Books:** Any books used should substantially deal with the descriptive chemistry of all the elements, your group of elements or an individual element. General chemistry and most inorganic chemistry textbooks are not acceptable because they do not have descriptive chemistry as their focus. Consider the publication date and try to find recent publications. Older references contain some good information (particularly historical) and are worth looking at, but be aware of their limitations. The language may be archaic (valency, when oxidation state is the more correct term) and information about production, usage and toxicity may be outdated.

Web: Information found on a webpage is always suspect. Try to find independent verification from other sources. Consider the background and motivation of the author(s). Be especially careful of statements about uses of the elements. Look for references on the webpage and check them out.


Article: Find an article from 2012 or 2013 Inorganic Chemistry that features one (or more) of your elements in a way not seen in any of the other reference sources. It should be a largely synthetic paper. Do not use theoretical studies. This part of the course deals with descriptive chemistry. Make sure you understand the article thoroughly. This section in your paper will contain a summary of the article, in your own words, focusing on the contribution of your element(s).

The outline will be a typed, bullet topics outline that contains detailed information and has the organization of the final paper. It will contain the headings below and contain all the information that will be in your paper (without a lot of connecting words). Never write anything in your outline (or say anything in your talk) that you do not fully understand. Check additional references, check the web, but, primarily, ask me. I will give you feedback on you outline that will be acted on in your final paper.

I. Introduction
Identify a Group “theme”. What do they have in common? How do they differ? Set up the paper with a paragraph that addresses these questions and others.

II. History
Discovery: by whom (first and last name), when, what circumstances (chemistry).
Name origin: stories and explanations

III. Isolation and Properties of the Elements
Describe: do not repeat history – include chemistry. Do not focus on where they are found. Talk about the chemistry. You do not have to include all the details.

IV. Chemistry
Oxidation states in general. Do not just list. Identify the most stable oxidation state(s).
Example balanced reactions of the elements with other elements – identify patterns and oxidations states.
Example balanced reactions of the compounds. Do not repeat isolation of the elements (above).
radiochemistry?

V. Elements, Compounds and Their Uses
Explain why (chemistry) it is used and in what form. Make sure this is current.

VI. Current Research
A single specific article from recent (2012, 2013) Inorganic Chemistry on one or more of the elements in your group. Describe the article in your own words. Including any relevant chemistry talked about in your paper is especially important. Give structures.

VII. Conclusion
Revisit the introduction

Bibliography

1. Weeks, Mary Elvira Discovery of the Elements; Published by the Journal of Chemical Education, Easton, PA, 1968. Available online at the JCE website (jchemed.chem.wisc.edu/ search under “Mary Weeks”) (reference as a book.)


2. Paper
The paper will be 6 – 10, double-spaced pages, size 12 Times New Roman font that contains all your research, put together according to your outline, and proof-read for spelling, punctuation and grammar (see below). Three weeks after the outline is returned, turn in a hard copy and send me an electronic copy (MS Word).

Keep the following in mind when writing the paper:

1. As in the outline, never include any statement that you do not fully understand.

2. Do not use words or phrases that you would not normally use. That is likely to be recognized as plagiarism (see below). For example, do not say “… a feebly basic earth.” You could write “… a weakly basic oxide of…”

3. Be a chemist. Do not include anecdotal statements of uses and toxicity (typical problem areas) that cannot be backed up with at least an attempt at a scientific explanation. For example, the following statement was found on a webpage “Chromium helps insulin metabolize fat, turn protein into muscle, and convert sugar into energy.” That is not good enough for this paper. What oxidation state
of chromium are they talking about and how does it do this. Go beyond the easy reference.

4. Include properly formatted chemical formulae whenever possible. Know the difference between ionic and covalent substances and use IUPAC nomenclature. Ask if you are not sure. Make use of chemical equations and be sure they are balanced and accurate. **They will be presented set off from the text, as in textbooks.**

5. Oxidation states and ionic charges are often not the same thing. Oxidation state is given as Roman numerals (iron(III)) and charge is indicated with magnitude first, followed by + or – (Fe\(^{3+}\), O\(^{2-}\)).

6. Do not include atomic number, formula weight, e\(^-\) configuration, melting and boiling points, etc., in the text. A single table can be used. Reference the table if the information is interesting or unusual (highest melting point on periodic table, longest liquid range of any element, etc.)

7. Do not describe theory (as given in class). You can reference or recognize the significance or origin of a fact.

8. Citations will be in the form of superscript reference numbers, with sources listed in a “Reference” section at the end of the paper. See the section on “Plagiarism” for information on when and where citations are needed.

In the past, some papers have read as if each point had been written on an index card, and then thrown together in random order. The organization should be logical, with consistency in format and structure. Make clear why one point follows another: each point should connect with the next. Use transitions between and within paragraphs. Avoid making the same statement several times in the paper.

The grade will be based on: Organization
Depth of coverage
Information interpretation
Correct use of sources
Grammar and mechanics
Professional tone
Correct use of course-specific concepts and terms