Article Assignment #1:

Analyzing a journal article for basic themes, roles of authors, and the scientific method

Locate the following article online and answer the questions below:

Martin, D. J.; McCarthy, B. D.; Donley, C. L.; Dempsey, J. L. Electrochemical hydrogenation of a homogeneous nickel complex to form a surface adsorbed hydrogen-evolving species. *Chem Comm* **2015**, *51*, 5290–5293; DOI 10.1039/c4cc08662g.

You will not be expected to read and understand the entire paper at this point in the semester. We will revisit the paper again later in the semester, however.

1. Look at the list of authors and the footnotes for each author.

a. At which university was the work completed?

1. Use Google to find the website for the institution’s chemistry department. Based on the list of faculty, who is the professor that directed this research project? Where does that person appear in the list of authors and what symbol appears by their name?
2. Keep following the links to that professor’s group page and then go to the “People” page. Which of the authors were graduate students? Which were undergraduates? You may need to check the Group Alums page for some authors.

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1. The first author on a paper is typically the person who did the bulk of the experimental work and writing. Based on your investigation of the group’s web page, was the first author of this paper the professor, a graduate student, or an undergraduate student?

2. The authors refer throughout the paper to the Electronic Supplementary Information (ESI).

a. Where can the SI be found?

b. What is the purpose of the SI (what information is found here)?

3.  Consider the hypothesis and reasoning the authors present for investigating these particular complexes.

1. What was the original hypothesis in the paper?
2. How did the experimental evidence either support or refute this hypothesis?
3. How did the project aim change during the course of the research?

4. The introduction of a research article identifies the research area, establishes its importance and provides background information. It also identifies needs and gaps in the area and how the research project plans to address them.

1. Briefly describe the research area of this project.
2. What are the overall goals on which this research group is focused?
3. Who funded this research and why does that make sense in terms of the overall goal?

5. Why did the authors choose to work with the particular ligands in the complex **1**?

6. Find definitions for the following terms mentioned in this paper:

1. electrocatalysis
2. cyclic voltammetry
3. surface adsorption
4. hydrogenation
5. Faradaic efficiency

7. Write down the balanced chemical equation of H2 evolution.

8.       Why do the authors make and then use complex **2** as a control for complex **1**? (Hint: what variable are the authors concerned with?)

9.   According to the authors what are the advantages of molecular catalysts?

10. Describe the differences between homogenous and heterogeneous catalysis.

11. What is the most important finding/conclusion of the paper?