

Review of: "An Experimental Method to Calculate Average Metal Ions Charge by Electrolysis at Different Temperatures"

Nimel Ross¹

¹ University of Johannesburg

Potential competing interests: No potential competing interests to declare.

Overall, the manuscript presents an interesting experimental approach to determine the average charges of metal ions through electrolysis at varying temperatures. The utilization of Faraday's law of electrolysis for calculation is commendable. However, several points need to be addressed to enhance the clarity and rigor of the paper.

Introduction: The introduction should provide a clear context for the study. Why is determining the average charges of metal ions important? Elaborate on the significance of this research in terms of applications or contributions to the field.

Methodology: a. **Experimental Setup:** Provide a detailed description of the experimental setup, including the type of electrodes used, their dimensions, and any additional equipment. This will help readers to replicate the experiment.

b. **Electrolysis Parameters:** Explain the rationale behind choosing NaCl solution as the electrolyte and the concentrations used. Also, discuss the reasoning behind selecting specific temperatures (room temperature and 100°C).

c. **Data Collection:** Elaborate on the procedure for measuring direct electric current and anode mass decrease accurately. Discuss the precautions taken to ensure reliable data collection.

Data Analysis and Results: a. **Calculation of Average Charges:** Clearly outline the mathematical equations and steps used to calculate the average charges of copper, iron, and aluminum ions. Provide sample calculations in an appendix to aid readers in understanding the calculations.

b. **Discussion of Results:** Explain any trends or variations observed in the calculated average charges across different temperatures and metals. Discuss possible sources of error and their impact on the results.

Discussion: a. **Comparison to Literature:** Compare the calculated average charges with existing literature values for these metal ions to validate the accuracy of your method.

b. **Temperature Dependency:** Discuss the observed changes in average charges with temperature for copper ions (1 to 1.5) and the implications of this variation. Is there a theoretical basis for this trend?

c. **Aluminum Charge at 100°C:** Explain the reason for the inconsistency in the aluminum charge at 100°C (from +3 to +3) and whether this discrepancy could be due to experimental limitations.

Conclusion: Summarize the main findings of the study and their implications. Address whether the method successfully

determines average metal ion charges at different temperatures.

References: Ensure that all references are accurately cited within the text and listed in the references section using a consistent and recognized citation style.

Language and Clarity: The manuscript needs thorough proofreading for grammar, syntax, and clarity. Clear and concise writing will enhance the overall presentation of the study.

Figures and Tables: Include clear and labeled figures and tables that assist in visualizing the experimental setup, data collected, and calculated values. Each figure and table should be referred to and explained in the text.

By addressing these points, the manuscript will become more comprehensive and accessible to readers. The experimental method's potential contribution to the field will be more apparent, and the rigor of the study will be evident.