

## Abstract

The identification of salt is crucial because, each element of the structure may have an impact and influence the nature of the dilution reaction. Additionally, the concept of identifying salt is important since people can generally discover various compounds to build up that same element without negatively impacting environmental circumstances. Finding new techniques to make salt and identifying it can increase our scientific research as well as the economy throughout its entirety, understanding.



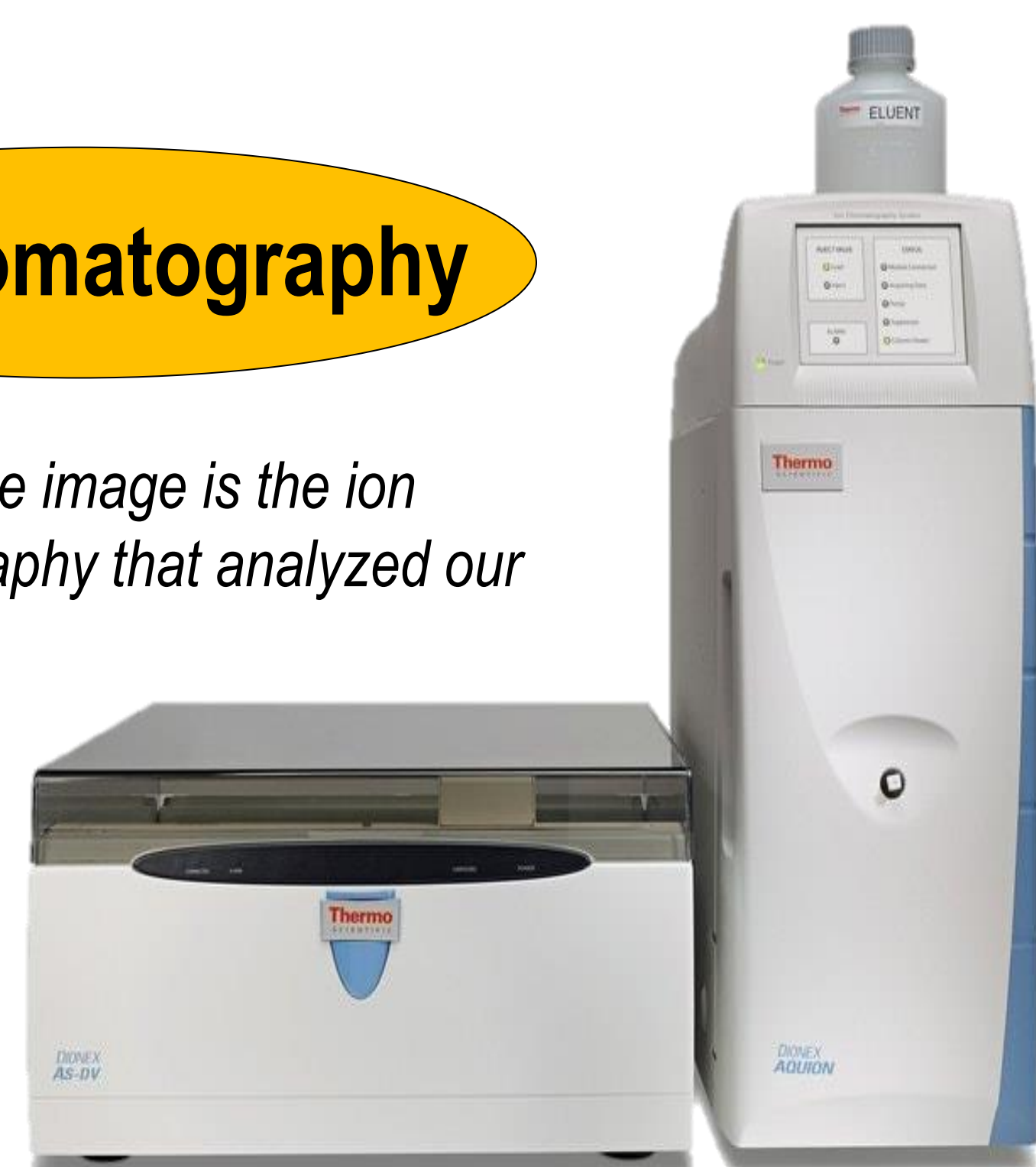
Figure 1: The image is one of the samples we analyzed by first converting it into a liquid.

## Materials & Methods

The ICP-MS and Ion chromatography (IC) are just two of the many technologies we utilize during our research. The IC ability is to measure concentrations of major cations like sodium, potassium, calcium, and magnesium in the parts-per-billion (ppb) range as well as major anions like fluoride, chloride, and sulfate. This helped us with our overall research since, before getting our results, we used ion chromatography, which helped separate ions depending on the interaction of various phases, such as the stationary and mobile phases of the sample. In addition, we utilized the scanning electron microscope whose function is to produce a largely magnified image by using electrons.

### Ion Chromatography

Figure 2: The image is the ion chromatography that analyzed our samples.



The Inductively Coupled Plasma Mass Spectrometry (ICP-MS) is a different tool we used. It is intended to analyze particular liquids and uses plasma to ionize the sample. The sample is atomized, and small polyatomic ions are produced and measured. We can identify specific concentrations of each sample as well as how it appears in the water by using these two pieces of equipment. Their graph demonstrated to us that its emergence had either been apparent or too subtle to be recorded as a significant component.

### ICP-MS

Figure 3: The ICP-MS is an instrument that analyzes liquid such as our sample.



### The Scanning electron microscope

Figure 4: The following shows the scanning electron microscope we utilized.



## Results & Discussion

We had been analyzing some of the elements during our investigation, but we weren't aware of their chemical composition. We were given two salts that, depending on the outcome of our investigation, would produce either a high or low concentration of each sample. We used a variety of techniques during our research and development to identify the salt they were, such as ingesting several samples at varied induction periods.

### Chloride Concentration

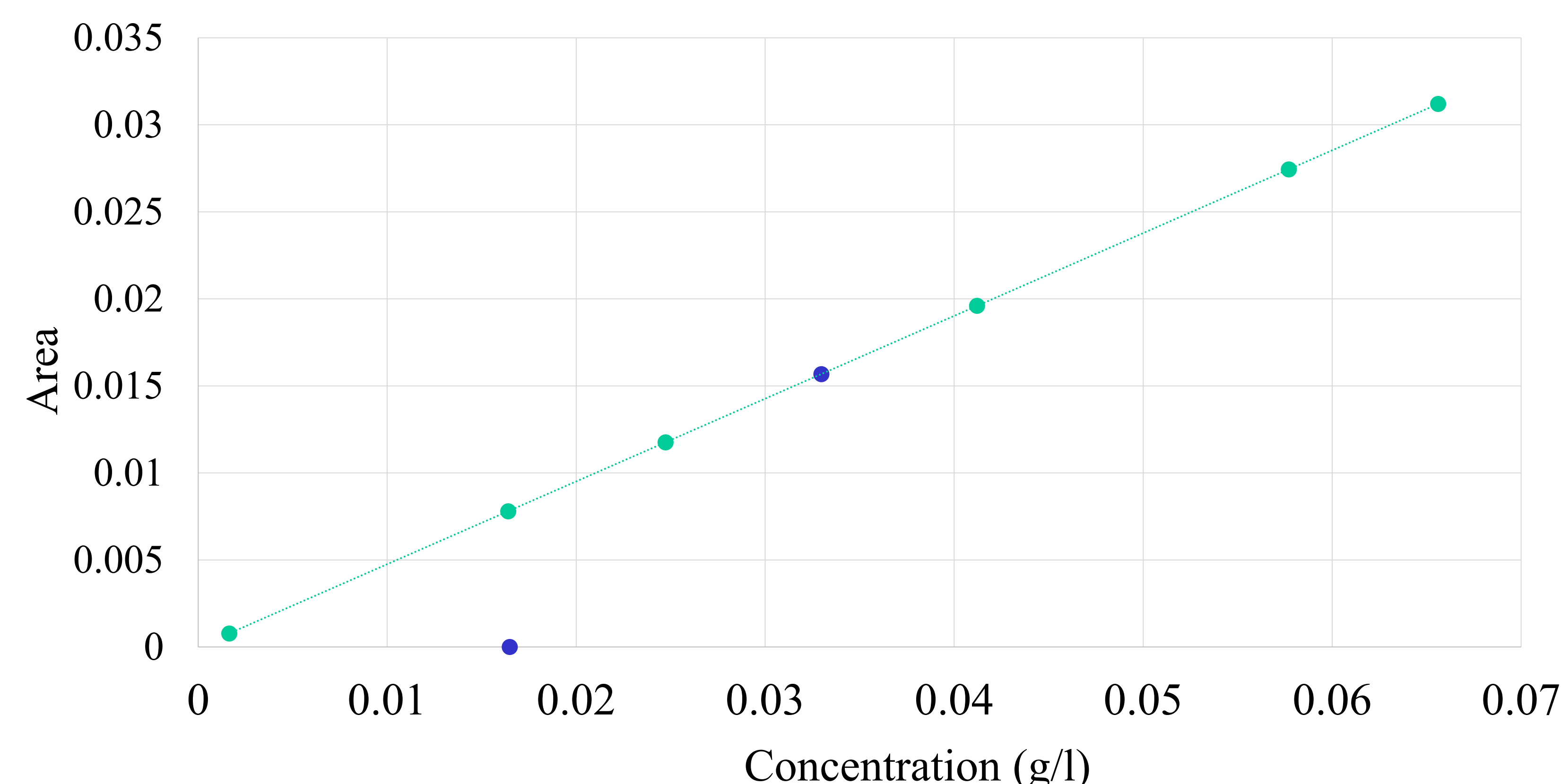
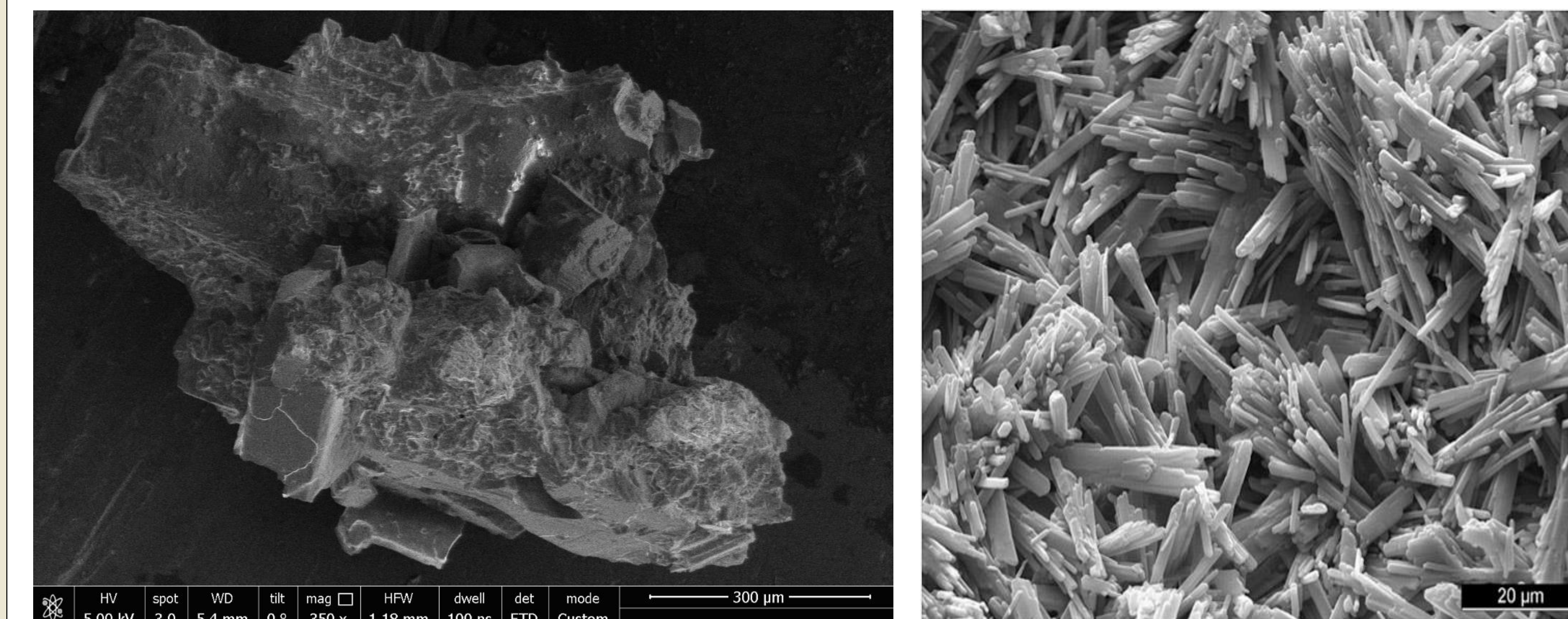


Figure 5: Demonstrates the linear concentration of the appearance of Chloride in the sample.

We were able to analyze each of the components that appeared in the result by using IC. The concentration of chloride that was identified in that sample was higher than what is displayed in the graph above. Our graph displays the linear ratio once chloride was a significant component.

As previously noted, we received a sample to test. In our second attempt to test the sample, we were looking for sulfate and discovered that it had not been as noticeable as chloride. We concluded that the salt had been a chloride salt with little to no sodium sulfate present.



Figures 6 and 7: The comparison of two salt components using a scanning electron microscope is shown above. The image on the left is of our samples, while the one on the right is of calcium sulfate. It demonstrates that our sample seems to prefer a chloride structure over any sulfate comparisons.

## Takeaways

My excitement for the course material has grown, and I enjoyed working in the lab. I was first a little worried, but as time passed, I developed an interest in a profession associated with the one I am in. Additionally, the mathematics used in the curriculum at the institution that was pursued helped me and allowed me to keep learning new topics. I want people to know that even though it could be challenging, your team is here to answer any issues. I learned that in order to gather accurate data and analysis while working in a lab, you must be extremely patient.

## Acknowledgments

I want to start by thanking Mr. Dorfman for providing the scholarship that made it possible for me to participate in the USC Shine program. I want to express my gratitude to my mentors Shounak, Weijian, and Martijn for their guidance and support during the program and for their outstanding explanations. I want to express my gratitude to Professor Childress for introducing us to her staff and making us feel welcome. To continue, I want to say how appreciative I am for the outstanding support I receive at home, especially from my siblings, who push me to work for my objectives and lend a hand when I need it.