CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
S0510

Project Title
Investigating Halide Anion Interaction with Water Molecules

Abstract

Objectives/Goals
The objective of this experiment is to determine the difference in energy interactions of halide anions of different sizes with water and what they may depend on.

Methods/Materials
A calorimeter was used to determine the enthalpy of solution of a series of sodium halides. Each of these values were then added to their respective sodium halide lattice energy to find the energy involved in the interaction of gas phase ions with water molecules. These results were then plotted to determine their dependence on the anion radii and volumes.

Results
It was discovered that the smaller the anion, the more exothermic its interaction with water. More of a linear relationship was found with the radii than with the volumes.

Conclusions/Discussion
Because the linear relationship is better between the ionic radii and the change in enthalpy of solution, I am led to believe that the closeness of the water molecules to the ions is more likely to be the reason for the anions interacting differently with water than the number of water molecules that interact with each ion. I would like to further study these anions by using other salts to test this conclusion to learn if it is correct. It would also be fascinating to investigate difference of interaction between cations and water molecules.

Summary Statement
Heat of solutions were used to study the interaction of halide ions with water molecules.

Help Received
Used lab equipment at Pomona College.