CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
S0525

Project Title
Effects of Chemical Contamination on Aluminum Potassium Sulfate Crystal Growth

Abstract

Objectives/Goals
The goal of this experiment was to determine the effects of contamination on the growth of aluminum potassium sulfate crystals.

Methods/Materials
Saturated aluminum potassium sulfate solutions were contaminated with each of four contaminants: potassium ferricyanide, chromium aluminum potassium sulfate, nickel sulfate,and copper sulfate. They were seeded with small, pure aluminum potassium sulfate crystals, and growth was measured daily in centimeters. Control crystals were also monitored.

Results
The crystals grown from the contaminated solutions were generally not affected in appearance, but their growth rates were altered. With 0.5 gram of contamination, the growth was slowed by 33 percent. With 1 gram of contamination, the growth was slowed by 66 percent. The chromium aluminum potassium sulfate was the contaminant that affected appearance. The color was a cross between the aluminum potassium sulfate and the chromium aluminum potassium sulfate. When 1 gram of copper sulfate or nickel sulfate was used, the seed dissolved completely. Potassium Ferricyanide created a visible layer over the seed crystals.

Conclusions/Discussion
The hypothesis tested was that contamination would result in smaller crystals, and this experiment supported it. The experiment provided knowledge of some effects of contamination on crystal growth. Another connection with this experiment is in electronics. The properties of contaminated crystals are extremely important in creating semiconductor devices. Contamination can create positive or negative charges, which can be directed through wire as an electrical current.
This experiment expands knowledge in chemistry by showing how chemicals can crystalize and behave differently depending on their surrounding environment.

Summary Statement
Aluminum Potassium Sulfate (alum) crystals were grown from contaminated alum solutions to understand the effects of contamination on the resulting crystals.

Help Received
My grandfather helped me to buy the chemicals I needed for this experiment.