

How Does Your Crystal Grow? ***Observations of Copper Sulfate***

Purpose: This active allows you to observe the crystallization process, record images of crystal growth over time, and analyze recorded images.

Materials:

Saturated solution of copper sulfate
Laptop
Compound Microscope
Hot plate
Hot pad
Goggles
Disposable dropper
Depression Slide
Stop Watch
Graph Paper
Ruler
Floppy Disk
Kimwipes

Procedure:

1. Prepare laptop and microscope to save image (follow “Motic Software and Digital Microscope Directions”).
2. Using proper safety precautions, carefully add a drop of copper sulfate solution to a depression slide and place onto stage of compound digital microscope.
3. Immediately focus and capture image.
4. Continue to capture image every 15 seconds for 2 minutes.
5. Save each image onto a floppy disk and name “copper sulfate” along with time at which the image was captured.
6. Turn on the “measure” feature on you computer software.
7. Set your measuring tool to the correct lens objective.
8. Set the measuring feature to microns.
9. Systematically open each image and measure **ONE** crystal for the duration of the two-minute image series.
10. Record the length onto Data Table 1.

Data Table 1: Copper Sulfate

Time Interval Image was Captured	Length of Crystal in Microns
0 seconds	
15 seconds	
30 seconds	
45 seconds	
60 seconds	
75 seconds	
90 seconds	
105 seconds	
120 seconds	

Data Analysis:

1. Graph the results for both data table 1.
2. Is the graph linear?
3. If your graph was not a straight line, what could be the cause?
4. Are there any places in the activity where you could have made errors? If yes, where?
5. What could you do to improve the lab?
6. What is happening during the crystallization process at the molecular level?
7. How did the crystal grow? (Where did the new material come from?)
8. Name some other crystals that occur in nature.

Crystallization of Copper Sulfate
Teacher Notes

Before the Lab Activity:

1. Science in Motion can provide you with a saturated solution of Copper Sulfate.
2. Six lab stations consisting of laptop computers and digital compound microscopes should be assembled in advance. Allow approximately 50 minutes to set up and check all stations.
3. Set up one station with the projector unit.
4. Set up hot plate in a safe location.

Science in Motion

Materials List

Lab: How Does your Crystal Grow

Number of Lab Stations Prepared: _____

Total number of classes: _____

Total number of students: _____

Equipment	Packed	Returned
Digital compound scope with accessories		
Laptop with accessories		
Hot plate (one only)		
Goggles		
Hot pads		

Consumable Materials	Packed	Returned
Super saturated solution of copper sulfate		
Depressions slides (one per microscope)		
Disposable droppers		
Floppy disk (one per lab group)		
Hard Copy of Lab Protocol		
kimpwipes		

