



California State University of Bakersfield, Department of Chemistry

Alum, Borax, and Epson salt Egg Geodes



Standards:

2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen.

Introduction:

Learn about the process of crystallization by creating these beautiful geodes! In this experiment, you will create crystals from different minerals using super saturated solutions. You will observe that different minerals create different shaped and sized crystals dependent on saturation and cooling rate.

Materials:

- Eggshells
- Alum powder
- Borax
- Epson salt
- Food coloring
- Q-tip
- Beaker or glass container
- Drying rack
- White glue

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Safety:

- Always have an adult with you to help you during your experiment.
- Always wear eye protection and gloves when doing chemistry experiments

Procedure:

1. Crack the eggs, dispose of the insides, and rinse out the egg shell halves.
2. Once the shells have dried, use a Q-tip or paint brush to spread glue on the inside of the shell. Then, sprinkle alum powder, Borax, or Epsom salt on each eggshell until completely covered. Leave the shells to dry overnight.
3. Prepare the solution necessary to grow the crystals in by boiling two cups of hot water. If colored crystals are desired, add food coloring.
4. Add $\frac{3}{4}$ cup of Alum powder or 1 cup of Borax to the solution. Make sure the substance dissolves.
5. Leave the Alum or the Borax solution to cool slightly (approx. 30 min) before placing the corresponding eggshells into each solution. Be sure to submerge the eggshell and keep the shell facing up
6. Leave the eggshells in overnight or longer if desired. Remove the eggshells, and leave them out to dry.

Data and Observations:

Record your observations in this space

Questions:

1. Do the crystals grow if left longer in the solution?
2. Try using different temperatures of solution to see how the size is affected by the cooling rate of the solution (i.e. hotter solution could equal smaller crystals)?
3. Do the crystals grow in a pattern? Or a specific shape? Why do you think this is?

References:

1. How To Grow Epsom Salt (Magnesium Sulfate) Crystals. (n.d.). *About.com Chemistry*. Retrieved August 4, 2014, from <http://chemistry.about.com/od/growingcrystals/ht/epsomcrystal.htm>.
2. Crystal Egg Geodes | Step-by-Step | DIY Craft How To's and Instructions| Martha Stewart. (n.d.). *Martha Stewart*. Retrieved August 4, 2014, from <http://www.marthastewart.com/343344/crystal-egg-geodes>.