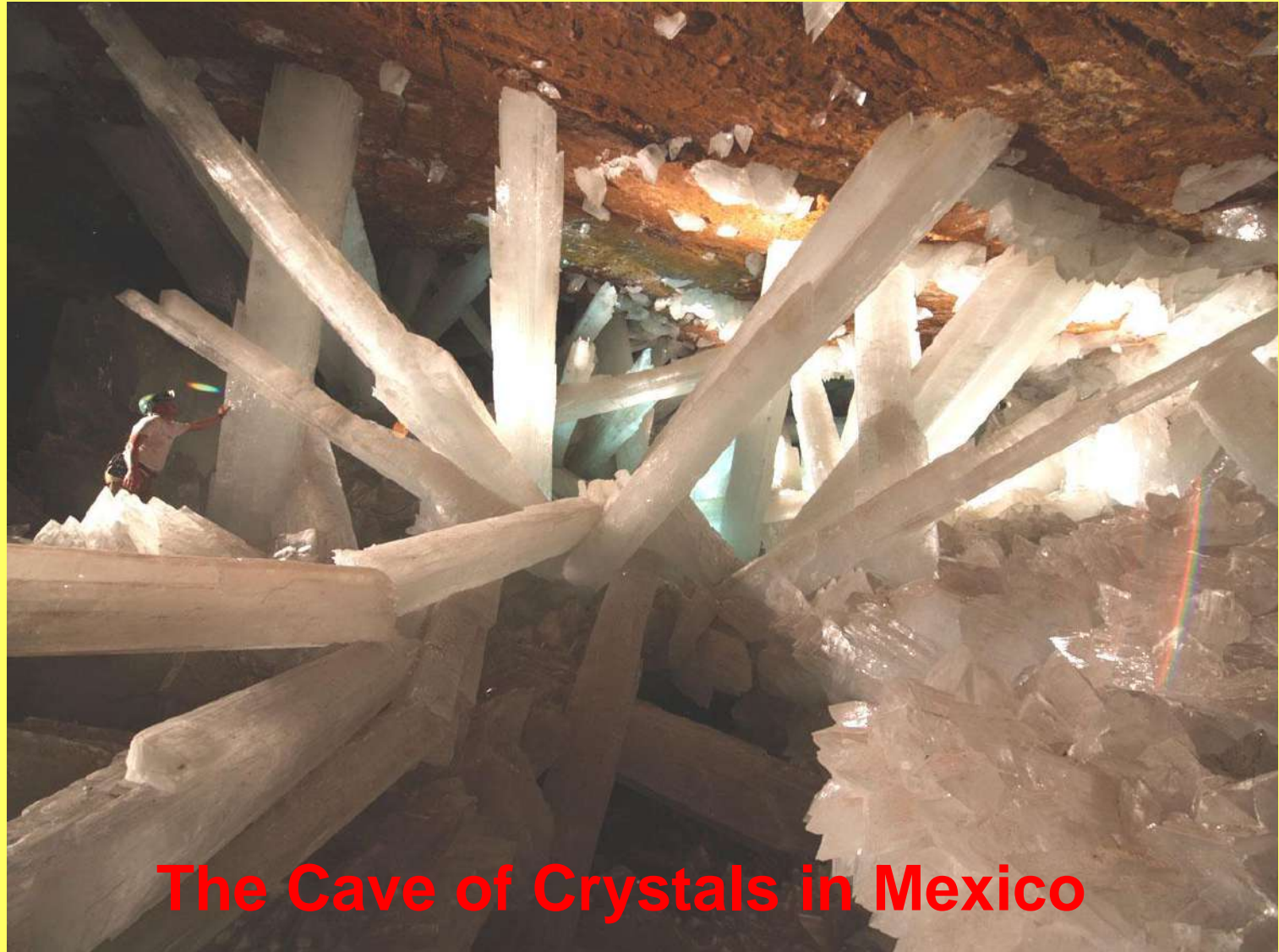


How Minerals Form



The Cave of Crystals in Mexico

How Do Minerals Form?

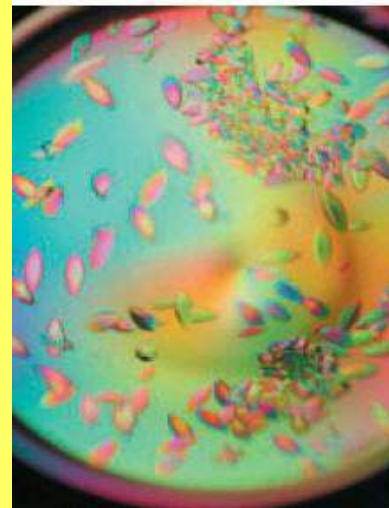
In general, minerals can form in one of two ways:

- 1. Crystallization of molten material**
- 2. Crystallization of materials dissolved in hot water to form solutions.**



What is Crystallization?

- Process by which atoms are arranged to form a material with a crystal structure.

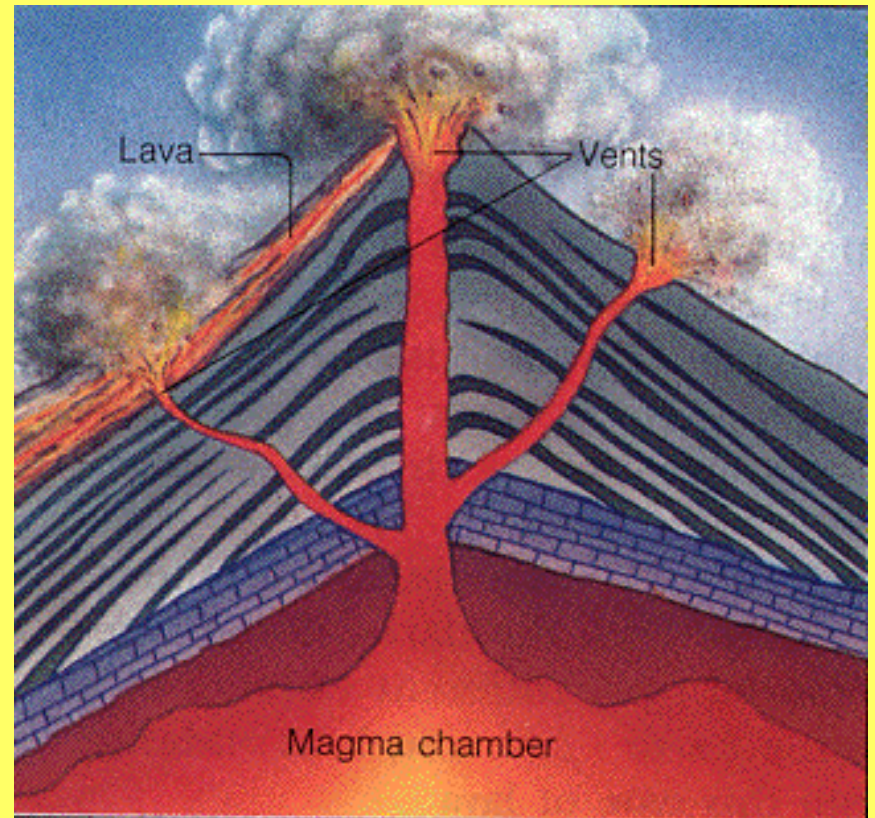


What is magma?

Magma is molten material from inside the Earth that hardens to form rock.

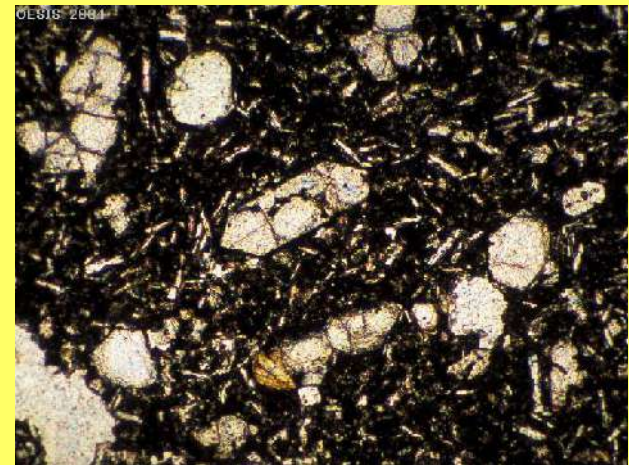
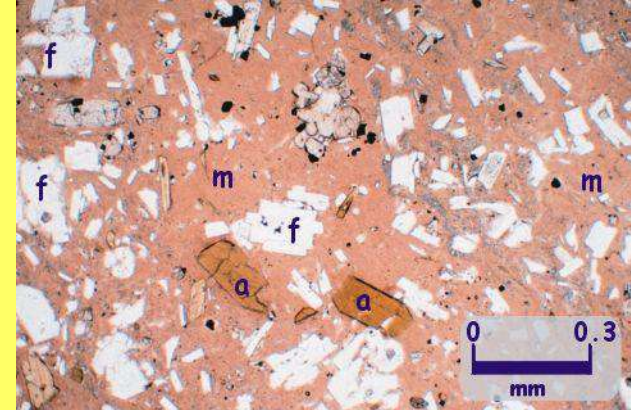
Lava is magma that reaches the surface.

Which one dries faster – magma or lava?



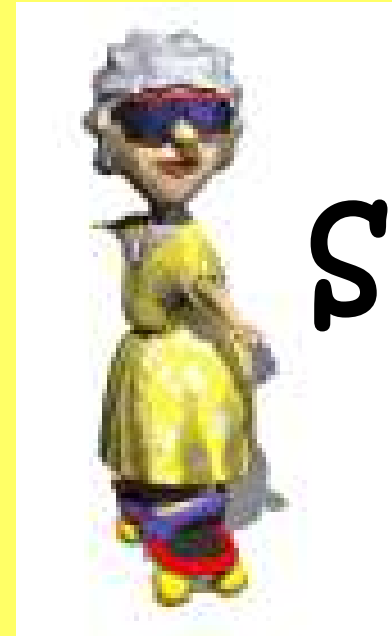
How do Crystals form from molten material?

- When hot magma cools inside the Earth, or as lava hardens on the surface. They form crystal structures.
- Notice the crystals in this granite. Compare and contrast the two samples. Why the difference?



What determines the size of the Crystals?

- Magma deep below = cools slowly = large crystals
- Magma closer to the surface = cools faster = medium crystals
- Lava = cools rapidly = small crystals



Slow

Fast



How do minerals form from solutions?

- When elements and compounds that are dissolved in water leave a solution, crystallization occurs.



**The Cave of
Crystals in Mexico**

How do minerals form from solutions?

1. Minerals formed by evaporation (Ex: Halite (salt) forms when ancient seas evaporate)

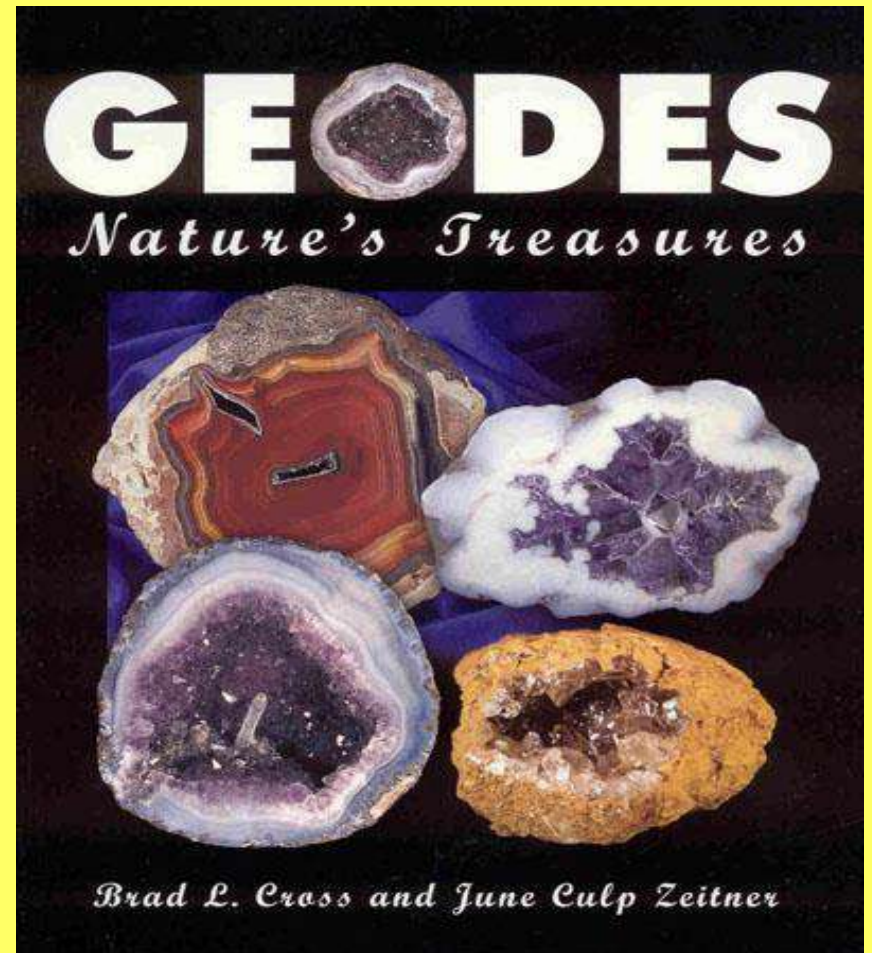


2. Minerals from hot water solutions (Ex: Veins of silver)



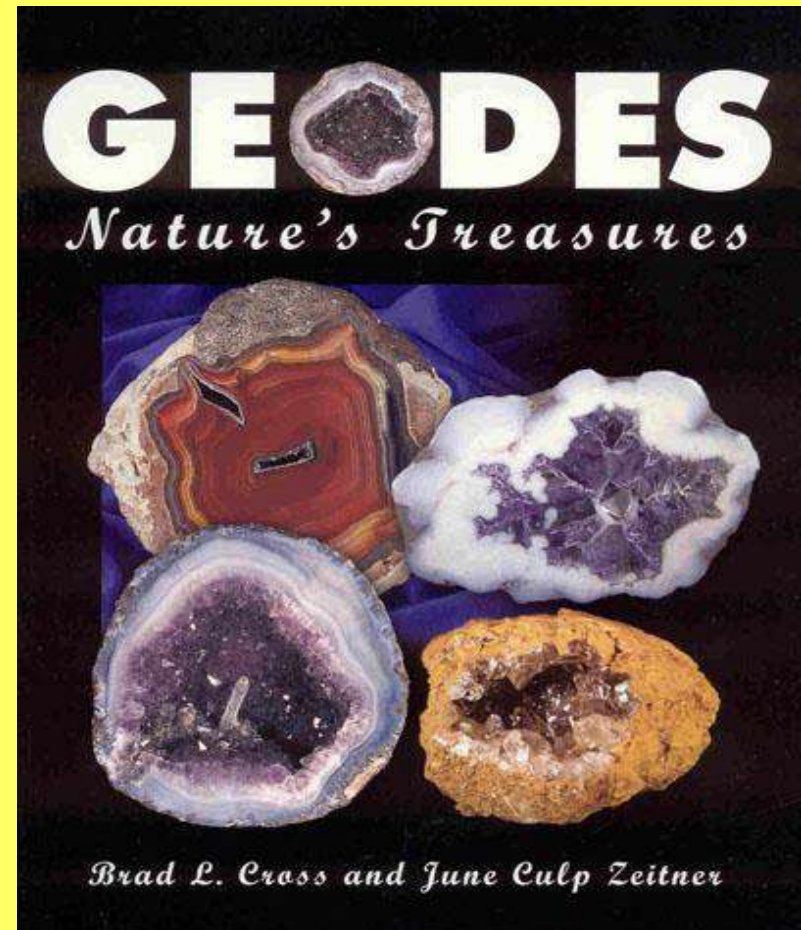
Geodes

- How do they form?



Geodes

- Geodes are usually formed in “bubbles” and other cavities in volcanic rock.
- Molten rock contains large amounts of dissolved gases. As the rock cools, these gases come out of solution and form “bubbles.”
- Water vapor is a major component of the dissolved gases. As the rock cools, water vapor gradually condenses to become very hot water. The hot water with its high concentration of dissolved silicon dioxide is squeezed into the bubble cavities.
- As the rock slowly cools, the silicon dioxide crystallizes to form quartz crystals on the inside walls of the “bubble”, and gradually starts transforming it into a geode.



How diamonds are formed?

- <http://www.youtube.com/watch?v=vHPOp69SO9E&feature=related>

