

make your own comet

ingredients:

- large polythene sheet to protect floor
- bin-liner bag, to line bowl and draw comet together
- mallet, to crush some dry ice to powder
- substantial plastic bag, in which to crush dry ice
- gardening gloves (heavy duty type)
- mixing spoon
- dry ice pellets, 10 kg
- garden sand, 1 kg
- water, 2 litres
- soil, 1 handful (organic constituent)
- worcestershire sauce (organic constituent)
- smelling salts (organic constituent)

recipe:

do this in a well-ventilated area.

wear safety spectacles and gardening gloves.

1. line mixing bowl with bin liner.
2. pour in half a litre of water and several handfuls of sand.
3. stir and add crushed dry ice.
4. stir and add worcestershire sauce, soil and smelling salts.
5. add more water. make sure that there is a fairly violent release of CO_2 , which indicates that you are cooling the mixture.
6. draw the mixture together with the bin liner and squeeze between your gloved hands. you will feel the comet is binding into a solid mass. if it feels loose you require more water and may require more crushed dry ice. uncrushed pellets on their own will not cool the water fast enough to form a solid mass.

fake gems & popcorn rocks

ingredients:

- epoxy
- polyester polymer resins
- food colouring
- iridescent cellophane
- glow-in-the-dark powder (strontium aluminate)
- mould release spray
- silicone chocolate moulds
- plastic cups
- dolomite
- white wine vinegar

recipe:

fake gems:

1. mix resin according to packaging instructions
2. pour into a second plastic cup to minimise unmixed resin
3. add a few drops of food colouring, glow in the dark powder or iridescent cellophane
4. slowly pour into moulds
5. leave to set for two days

popcorn rocks:

1. place an unwashed sample of crystal growing dolomite in a small glass or plastic bowl.
2. pour distilled white vinegar over the sample until it is nearly submerged. the rock should be just barely sticking above the surface of the vinegar.
3. place the bowl with the rock on a shelf or windowsill where it can remain undisturbed but can be easily observed. the warmer the location, the faster the vinegar will evaporate and the more quickly your aragonite crystals will appear and grow.
4. observe the dolomite every day as the aragonite crystals grow atop the rock. be careful not to touch them at this point as they are very delicate and will drop off.
5. let the bowl sit undisturbed until all the vinegar has evaporated and the rock is completely dry.

egg shell geodes

ingredients:

- egg
- copper sulphate (a salt)
- hot water

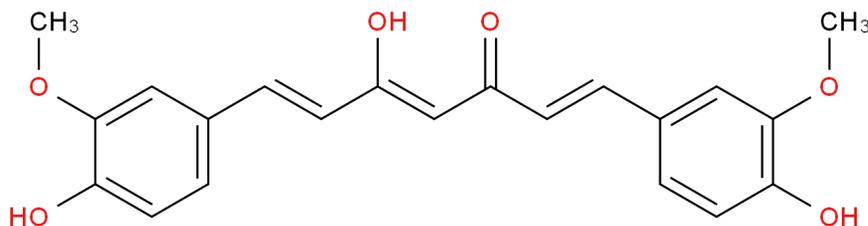
recipe:

1. carefully crack open an egg, discard the egg, and keep the shell. clean the egg from the shell. try for a clean break, to create two halves of the shell, or you may wish to just remove the top of the shell, for a more ball-shaped geode.
2. in a separate container, add copper sulphate to 1/4 cup of hot water. the amount of copper sulphate isn't exact. you want to stir copper sulphate into the water until no more will dissolve. more is not better! it should take a few pinches of solid material to make a saturated solution.
3. pour the copper sulphate solution into the dry egg shell
4. place the eggshell in a location where it can remain undisturbed for 2-3 days. you may want to place the eggshell in another container to keep it from falling over.
5. observe your geode each day. crystals should appear by the end of the first day and will be at their best after the second or third day.
6. you can pour out the solution and allow your geode to dry after a couple of days or you can let the solution fully evaporate (week or two).

turmeric fluorescence

ingredients:

- ethanol
- turmeric
- UV light



- turmeric, 'curcumin' is a conjugated molecule (alternating single and double bonds)
- the electrons that form those bonds aren't pinned down in one place, but can move along the whole molecule.
- the electrons have many possible energy states. the lowest energy state ("ground state") is one where the electrons are closest to the nucleus of the atom, and are paired up, with each electron in the pair spinning in the opposite direction.
- at room temperature, the electrons have enough heat energy to bounce around and bump one another between energy levels at random. most of the electrons will be in the lower energy levels at any given time.
- the electrons in the molecule have energy levels of different types. the basic energy levels are the electronic states (the ground state, the excited ground states, and the excited triplet state). but layered on top of these are vibrational and rotational energy states.
- these extra vibrational states allow the electron to absorb photons of different energies that raise the energy of the electron to different levels. since the energy of a photon is related to its wavelength (the color of the light), many slightly different colors of light can be absorbed by the electron to push it into higher energy states.
- once an electron has absorbed a photon and has jumped into a higher energy state, it can lose some of the energy easily by releasing the vibrational energy as heat. the electron then settles into the lowest vibrational energy level at that excited electronic state.