

Supercooled Water

Learn about ice and clouds!

Equipment

- ◇ Salt
- ◇ Water (bottled or distilled is best)
- ◇ A tub (such as a plant holder)
- ◇ A very clean, thin disposable beaker



Method

1. Mix enough water and salt to half fill the tub you are using. Mix in as much salt as the water will take. This solution is now called brine.

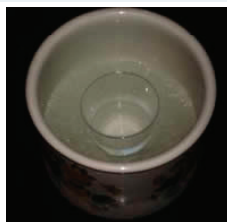
2. Pour the solution into the tub and put in the freezer for a few hours.

3. After a few hours take the ice out of the freezer and break it up a bit. The slush will be at about -12°C to -15°C !

4. Put the disposable beaker containing 2cm of bottled water taken from the fridge into the icy slush.

5. Leave for 20 minutes.

6. Take out the beaker and pour the supercooled water into an empty beaker- watch what happens....It freezes into slush on impact!!



Why did this happen?!

So why does it happen?

Ice can not form in supercooled water unless there are particles such as dust, ash or soot for it to form on. These particles are known as freezing nuclei. In the glass the supercooled water was poured into there will be some particles, such as dust, present which allow the ice particles to form.

How does this affect the atmosphere?

In a similar way to in this experiment, cloud droplets do not form even if the water is supercooled, if there are no condensation nuclei present. Quite simply, water needs something solid around which it can change from a gas (vapour) to a liquid form. Condensation nuclei for clouds usually takes the form of dust, ash, pollution particles or soot. A cloud condensation nucleus is usually 0.0001 mm in size.

In December 2010, an ice storm closed Moscows airports. Rain falling from a warm layer of air through a much colder layer became supercooled. As soon as it hit the ground, it froze, turning instantly into clear, 'glaze' ice.

For more detail on how to carry out the experiment, the science behind it and a video please this link:
<http://www.stevespanglerscience.com/experiment/instant-freeze-soda-ice>

www.rmets.org/experiments