

Why is the area around this piece of rock salt clean when there is still snow on the driveway?



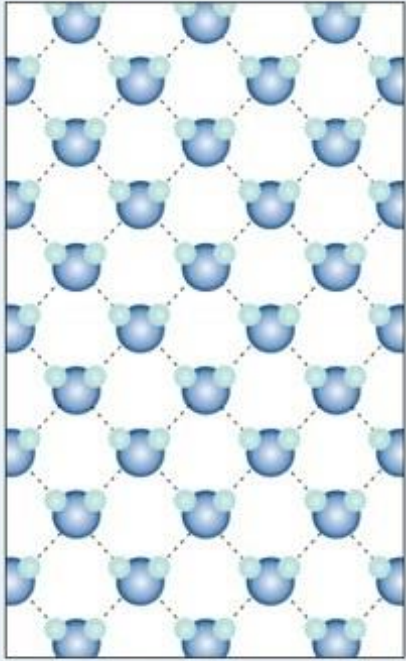
Why is the area around the salt dry?

Did you know that ice and water are the same thing? Ice is solid, or frozen water, and water is the liquid form of this substance.

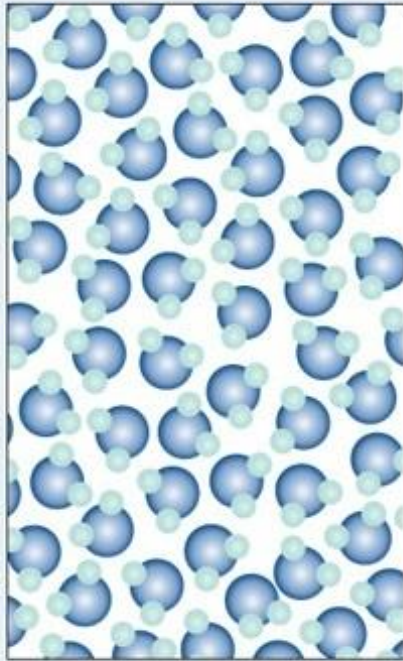
Water is H_2O and these molecules are arranged in different ways in these two states of matter.

- ◆ Liquid water, H_2O , freezes to ice at 0° Celsius, or 32° Fahrenheit. Ice, solid water, melts to liquid water at the same temperature. Think about it!
- ◆ Rock salt dissolves in water.
- ◆ Rock salt is sodium chloride, $NaCl$. Salts lower the freezing point of water so that the water remains liquid at a lower temperature.

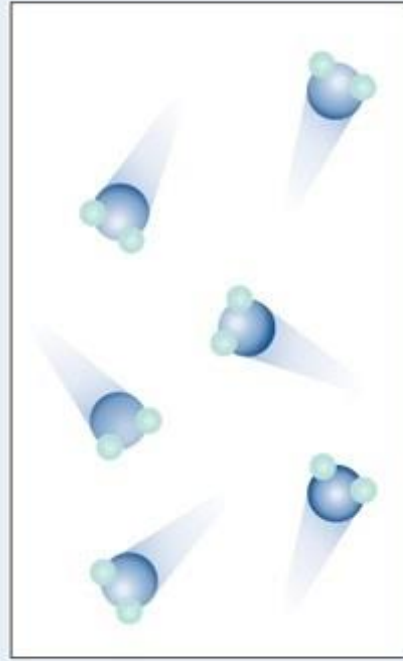




Water molecules in solid ice.



Water molecules in liquid water.




Water molecules in water vapour
- a gas.

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1. Study this illustration. Each one of those things that look like Mickey Mouse represents a water molecule, H_2O . Light blue = hydrogen, dark blue = oxygen. Notice 2 light blues and 1 darker blue per molecule.

2. Note the spacing between the molecules in the 3 diagrams. You are looking at models of water as a solid, liquid, and gas. Which is which?

3. Look closely at the diagram on the left, showing a model of solid ice. Do you see the dotted lines between molecules? Those represent weak bonds between the water molecules. They hold the water molecules together, loosely, and that keeps water as a solid. Heat the ice and it melts quickly because these bonds are weak.

4. The ions of the dissolved salt, Na^+ and Cl^- , disrupt the pattern of the water molecules and the water molecules can no longer keep their structure. There are other salts used on the road, such as CaCl_2 and they have more ions (3 instead of 2), so they cause more disruption. More expensive, though. 

How it Works

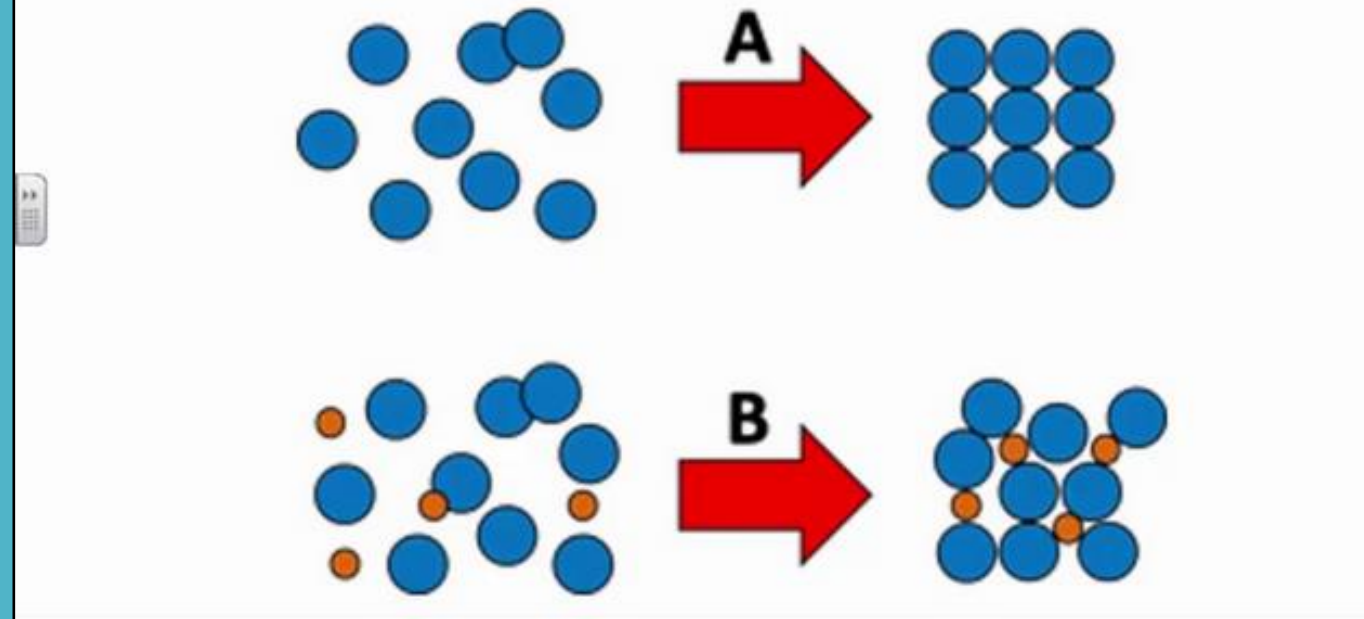


Diagram A = liquid turning into solid (water into ice)

Diagram B = red particles getting in the way of the liquid molecules so they can't come together and freeze (solidify).

We are talking about water/ice here, but this phenomenon, freezing point depression, is true for other solid/liquid pairs. The red particles can vary, too.