Ice - lab report example

Science

Ice

The effects of shape of ice on its melting time. Different shapes of ice of same mass and density melt at different rates. This was proved by an experiment in which we noted the melting time of ice frozen in different shapes of medicine bottles. To carry out the experiment the apparatus we used included four medicine bottles with different diameters, water, glass, an ounce measure, freezer, ruler and clock. To perform the experiment we first numbered the four different medicine bottles. We then put 1 ounce of water in each bottle and placed each bottle in the freezer. Then we waited until the water in all the bottles froze and turned into ice. We then took out the bottles from the freezer and placed each one of them in a glass full of hot water. We kept the bottles in hot water until we heard the ice crack and it slid from the bottle. When ice slid from each bottle we immediately measured the height and diameter of each ice piece. Then we placed each piece of ice on a wire grate and noted which piece of ice had come from which bottle. We placed the wire grate with pieces of ice on it away from the wind and waited for the ice to melt and noted the time with the stop watch. Meanwhile we calculated the surface area of the cylindrical ice pieces using the formula 2rh + 2r2 ; where r is the radius and h is the height of each piece of ice. We have used the formula of a cylinder to find the surface area of all pieces of ice because all pieces of ice frozen in different medicinal bottles had assumed almost the same cylindrical shape but they all had different diameters. We then repeated the whole experiment three times using the same medicine bottles and noted the time taken for ice pieces to melt in each trial as follows

Ice pieces in bottle number

1

2

3

4

Surface area of the ice piece in cm3

60

50

40

30

Average time in minutes

10

15

20

24

Time take in trial one

10

14

19. 5

25

Time taken in trial two

10

15

20. 5

23

Time taken in trial three

10

16

20

24

Our experiment proved that the shape of a piece of ice affects its melting time. As can be seen in the table the greater the surface area of a piece of ice the smaller it's melting time. The ice piece with surface area 60cm3 melted in only ten minutes while it took about 24 minutes for ice piece with 30cm3 surface area to melt.

Ice is made up of water molecules H2O. Two atoms of hydrogen are attached to one molecule of oxygen in one molecule of water of ice. Each oxygen molecule in ice is linked to four other oxygen molecules through covalent and hydrogen bonds to form a tetrahedral arrangement. Water molecules in this shape do possess some kinetic energy but that is just enough to allow water molecules to vibrate in their place and they are not allowed to break through their tetrahedral arrangement and move away from other water molecules. When ice starts to melt, it absorbs heat from the outside. An ice piece of a specific mass and density needs to absorb a specific minimum energy before it can start to melt. This specific minimum amount of energy required is known as the Latent Heat of Melting. Since in our experiment we used one ounce of water for each piece of ice, the mass and density of each piece of ice we used was the same and thus the Latent Heat of Melting required by each piece of ice was the same. Although in our experiment each piece of ice required the same amount of energy to melt, the ice pieces made from different shaped medicine bottles melted at different times. This is because each piece of ice had a different surface area. Surface area of the

ice determines how much area of the ice is exposed to the environment from which it can absorbs heat to melt; thus the greater the surface area, the greater the amount of heat the ice can absorb from the environment to melt. Since in our experiment ice pieces with larger surface area were able to absorb heat faster, they gained Latent Heat of Melting faster which caused them to melt faster than other ice pieces with smaller surface areas.

References

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