

NATS 101

Percentage Oxygen Concentration in Air Experiment

Materials:

100 mL graduated cylinder (caution - glass)
small piece of steel wool
small length of flexible tubing
large plastic drinking glass
paperclip

Starting the experiment:

Thoroughly soak the steel wool in tap water in a small container of some kind. Use a pencil to be sure the steel wool is completely submerged and does not contain any trapped air bubbles. After a minute or two remove the steel wool and blot off any excess water. The steel wool should be damp or moist but not dripping wet.

Fill the large drinking glass about 3/4 full with cold tap water. Push the moist piece of steel wool to the bottom of the graduated cylinder (the steel wool should remain in place when the cylinder is turned upside down). Insert about half the length of the flexible tubing into the cylinder; bend and hold the other end of the tubing against the outside of the cylinder. While keeping the ends of the tubing out of the water, invert the cylinder and slowly lower the open end of the cylinder into water in the large drinking glass. The tubing will allow water to rise up inside the cylinder so that its level can be read on the cylinder scale. Once the water has reached a point between the 90 and 100 mL readings on the cylinder, carefully pull out the tubing. The air sample is now sealed off from the atmosphere.

Make a note of the time (to the nearest 5 minutes is probably sufficient) and note the level of the water in the cylinder. Lower the cylinder until the open end is resting on the bottom of the plastic cup (be sure that if you tip the cylinder and lean it against the side of the glass that air doesn't escape from the cylinder).

With time, oxygen in the air trapped in the cylinder will react with the steel wool to form rust. As this occurs, you should find that the volume of air in the cylinder decreases. You will need to periodically measure the time and the volume of the air in the cylinder (you may need to raise the cylinder slightly so that the water level inside the cylinder is above the water in the plastic cup and can be seen and read). You should check the water level fairly frequently in the beginning of the experiment (every few hours if possible). Continue the experiment until the air sample volume stops changing (this may take a few days).



