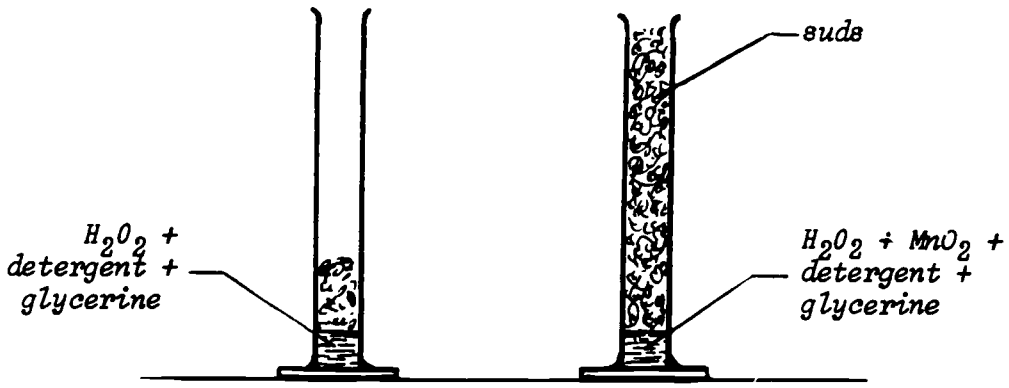
5.20. THE RISING SUDS

Materials:
1. Two tall cylinders or narrow jars.
2. Liquid detergent, glycerine, hydrogen peroxide (H_2O_2), manganese dioxide (MnO_2).
3. Two long stirrers (long straws will do).



Procedure:
1. Place about 10 ml of hydrogen peroxide and 5 ml of detergent, and about 5 ml of glycerine in each cylinder.
2. Add a pinch of MnO_2 to one of the cylinders and stir the mixture in both cylinders with the long stirrers.
3. Observe the difference in height of the produced suds in the two tall cylinders.

Questions:
1. In which of the two cylinders did the suds rise higher?
2. What causes the suds to go up higher in one of the cylinders?
3. What do we need to make soap bubbles?
4. What function does the peroxide have in this reaction?
5. What do the MnO_2 and the glycerine do?
6. Would the suds rise just as high without the stirring?
7. What other substances might be used in place of MnO_2?

Explanation:

The detergent functions like the soap when blowing soap bubbles. By adding some glycerine to the detergent, the surface tension of the liquid is increased, and the bubbles will stay longer before collapsing. In order to get suds in a soap solution when blowing bubbles, we need to blow through a straw into the detergent mixture. In this case we do not need to blow. Where are we getting the gas to blow the bubbles from? The gas is supplied by the hydrogen peroxide, which decomposes into water and oxygen. The MnO_2 acts as a catalyst for this oxygen producing reaction. It does not partake in the reations but only facilitates it. This means that the properties of MnO_2 before and after the reaction are unchanged. Dust and dirt particles or ashes could replace the MnO_2.