

# Lab size of an atom essay



**ASSIGN  
BUSTER**

The Size of an Atom LAB Introduction: In this particular experiment we are to measure the properties of certain substances using methods that cannot be done with standard measurement tools, such as a ruler, scale, or clock. For instance to find the size of the molecule of oleic acid we shall use an indirect method. If we know the volume of the oleic acid and the area it spreads out to; we should be able to determine the thickness of an oleic acid molecule.

Keeping in mind that for this to occur, the chemical properties of this acid as similar to that of oil. This means that once a droplet of the substance is placed on water it will spread out into a monolayer (typically one molecular high). We'll use indirect methods to find the volume. Essentially we're going to use  $\text{volume/area} = \text{Thickness}$ .

Procedure: Once the tray is filled up with water about 1 cm high, the Lycopodium powder should be added lightly as if it were seasoning for the water. Once that's done, you should release one drop of oleic acid solution to the middle of the tray from a height of 1cm. This is then the oleic acid will quickly spread pushing the powder aside. Record the diameter from three different angles and record them on the data table. Take the average of the three recorded diameters, consequently find the average radius. The volume of a single drop of oleic acid is obviously too small to record so we're going to use the indirect method.

To do so, use the eyedropper and fill a graduated cylinder to a level of 1mL counting the number of drops it takes. Record the numbers of drops in the data table then divide 1mL by the number of drops to get the volume per drop. Since the solution of oleic acid is only 0.5% we have to multiply the

volume of a drop by this number to get the amount of oleic acid in each drop. This is when we have all the information needed to determine the size of an oleic acid molecule.

Take the volume of oleic acid in the drop from the data table 2nd section and then divide by the area from the oil spill from data table 1st section. Be sure to convert your units. Volume to a  $\text{cm}^3$  using  $1\text{mL} = 1\text{cm}^3$  and that the area has the unit of  $\text{cm}^2$ . Data: Diameter 1 Diameter 2 Diameter 3 Avg.

Diameter Avg. Radius Area 2223232311.

5145. 476 # of drops Volume per drop Volume of oleic acid per drop 45.

022222. 000001 Volume/Area = Thickness . 000001/415.

4766. 87389 E-9 Conclusion: To conclude this experiment, we've found out the following: . 000001/415. 476 = 6. 87389 E-9 (volume/area = thickness) the thickness of oleic acid is 6.

87389 E-9. As you can see using indirect methods will get you results that are not quite possible otherwise without having a lab. You may get different results by having many trails of this experiment.