

LAB ACTIVITY: CLOUD CHAMBER

INTRODUCTION

Radioactive elements continually undergo a process of radioactive decay during which the nuclei emit (give off) high speed particles and rays. These are much too small to be seen even under a microscope. The cloud chamber is an instrument designed for the study of the trails of these radioactive particles.

To use the cloud chamber the air must first be saturated with water or alcohol vapor. When high energy particles plow through the air, electrons are knocked loose from some of the atoms and form ions. Ions act as excellent areas of condensation. This condensation, however, must be stimulated by cooling the air. The water vapor or alcohol condenses on the ions, leaving a vapor trail which clearly reveals the path of the radioactive particle.

In this lab activity you will be looking at the radioactive particles emitted by uranium ore.

PROCEDURE

1. Saturate the felt band on the inside of the cloud chamber with alcohol. Using forceps quickly place the radioactive source (uranium ore) on the bottom of the chamber. Place the cover on the chamber.
2. Place a slab of dry ice (obtained from the teacher) in a tinfoil or paper dish. Set the cloud chamber on the dry ice.
3. Wait until the air becomes saturated. Once the air has become saturated turn off the overhead lights and hold a flashlight directly over the chamber so that the light shines onto the black surface of the cloud chamber. Observe the tracks of the particles.
4. Answer the following questions:

- a) What differences did you observe among the tracks in the cloud chamber?
- b) What does this indicate about the rays?
- c) What is the purpose of the dry ice?
- d) Why is it a good idea to use a black-bottomed cloud chamber?
- e) If a strong magnet is available, bring it near the side of the chamber at note any changes in the tracks.