Cloud Chamber

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10:19 PM

Prelab Presentation.

Cloud Chamber is an apparatus that allows us to see particles decaying from a nuclear reaction.

In this case, we're looking for α-particle, ^4He.

Our α-particle source is a pin covered with ^{210}Pb isotope.

$$^{210}Pb \rightarrow {}^{210}Bi + e^- + \bar{\nu}_e \quad (22\,yr)$$

$$\hookrightarrow {}^{210}Po + e^- + \bar{\nu}_e \quad (5\,d)$$

$$\hookrightarrow {}^{206}Pb + {}^4He \quad (138\,d)$$

^4He has ~ 5 MeV of K.E.

* Cloud Chamber.

- Super saturated soup of alcohol chilled to -35 C.
- Particle passing through creates nucleation.

- Nucleation: Phase transition from gas → liquid due to ionization from α-particle
- this will create a track where α-particle passes through

* ^{210}Pb.
Radioactive plated needle.
see above for decay chains.

Source for ^4He at 5 MeV

Safety!!!!

Alcohols: flammable & Toxic.
Not the drinking kind!

Power on cooling before
the chamber.

Compressed Gas = Dangerous.

Gas escape through top hole
of the chamber.

Gas is an asphyxiant.
Do not run continously
Open door if needed.

Close cylinder valve
at the end of use.