



Studying ^{210}Pb Contamination In Copper

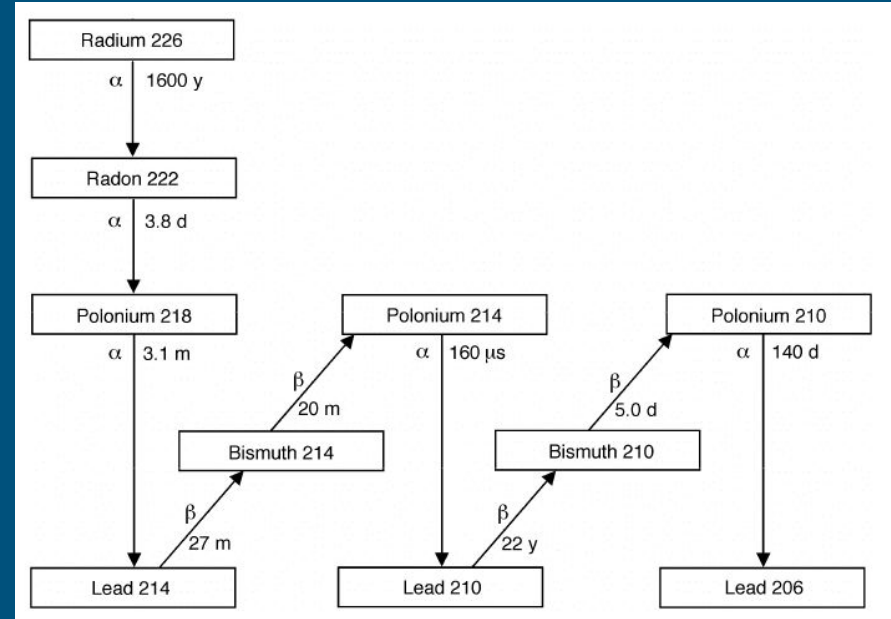


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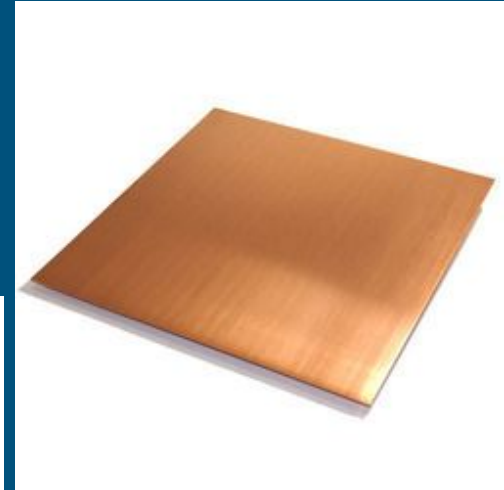
Introduction

- Copper is the most used metal for low background radiation measurements
- Radon 222 is part of the Uranium 238 decay chain with a half life of 4 days
- ^{210}Pb has a much longer half life leading to a build up when exposed to a Radon source



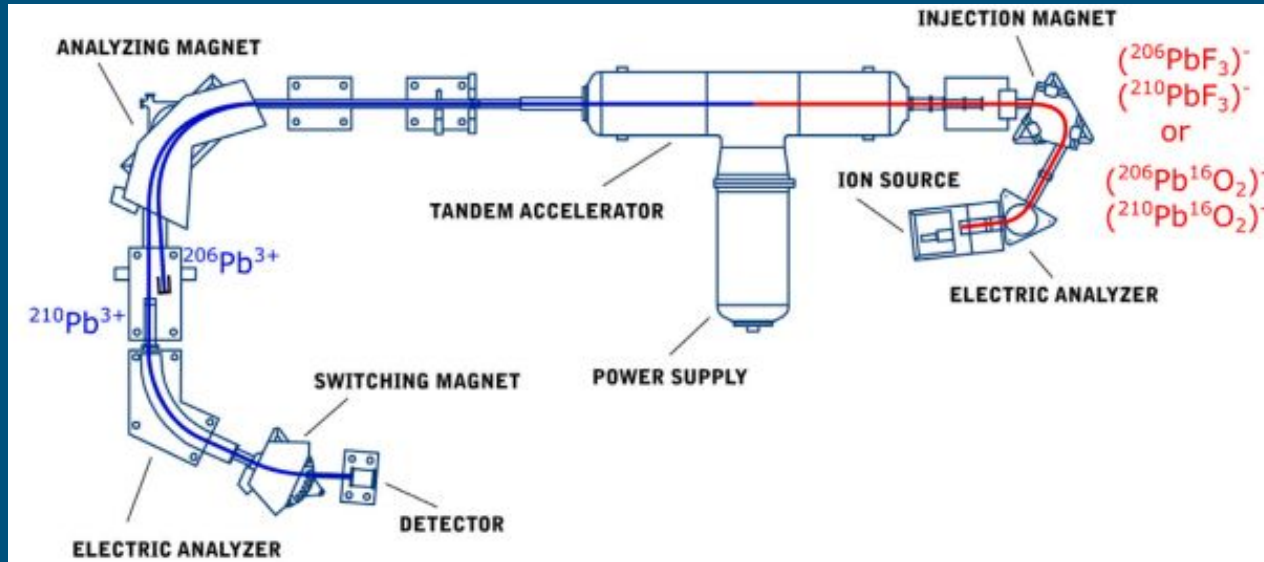
Introduction

- To study the ^{210}Pb contamination the lead needs to be extracted from the copper
- The copper can be dissolved in nitric acid and the lead precipitated



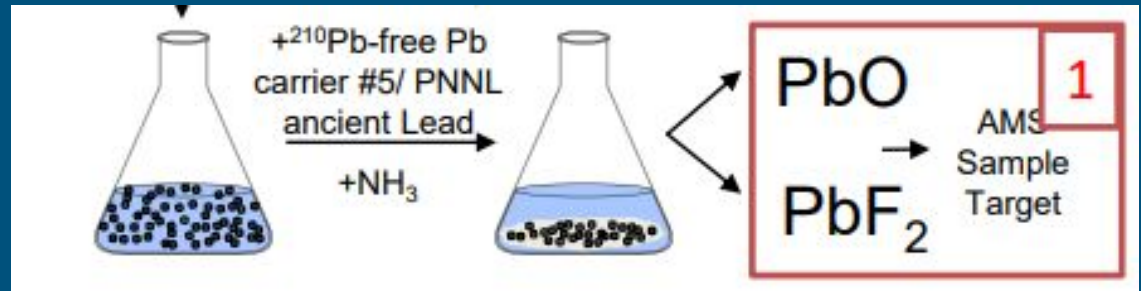
Introduction

- AMS is a technique used for measuring long lived radionuclides by utilizing a combination of electric and magnetic fields



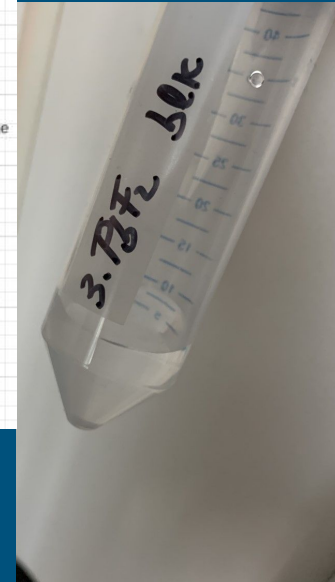
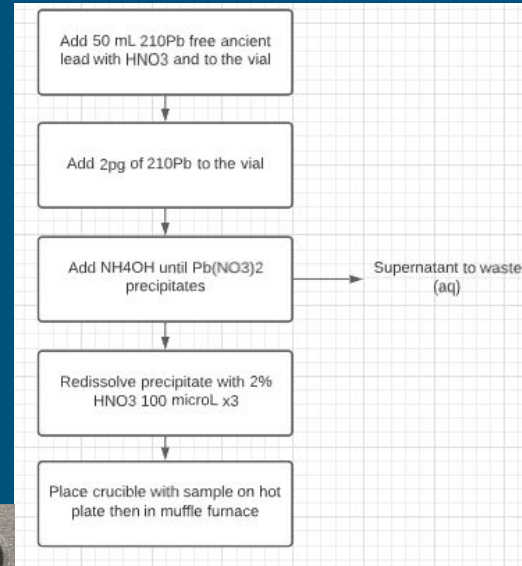
Project 1

- First experiment looked to precipitate lead from an aqueous solution
- Four blank mixtures and two standards were made
- Ancient lead is old lead where the system has achieved an equilibrium



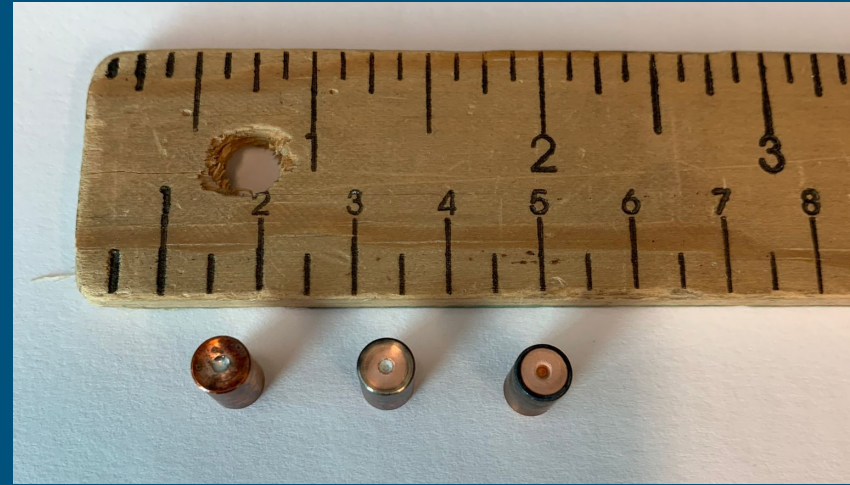
Project 1

- All samples had ancient lead added and 2 had a lead 210 spike added
- Ammonia was used to obtain PbO_2 and hydrofluoric acid to obtain PbF_3



Project 1

- The compounds were mixed by hand in the initial glass container
- Next step is to find the ideal lead to solution ratio to obtain a precipitate from a copper source



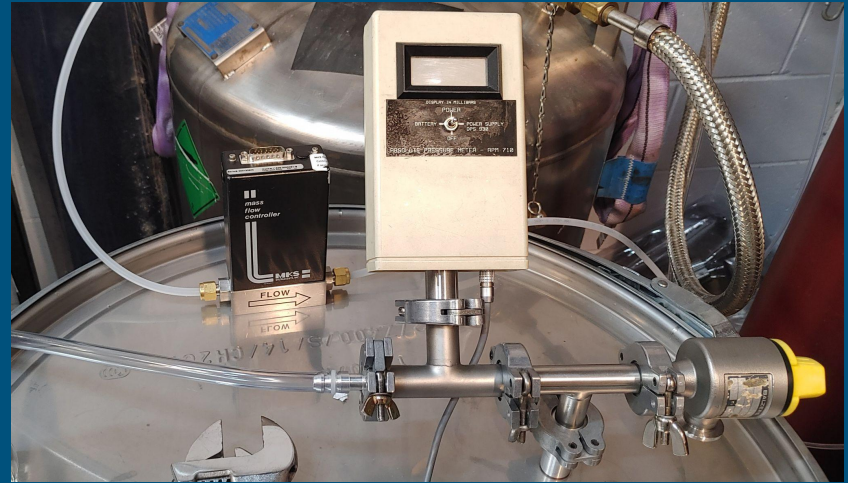
Project 2

- Goal of the experiment is to measure ^{210}Pb contamination after exposure to a source of radon
- To do this nitrogen gas will be used to create an air flow to the Rad7 machine
- The contamination will then be removed using an etching technique



Project 2

- The background in the barrel had a measurement of 2.55 Bq/m³
- An arduino board using a PID code was used to control the pressure in the barrel
- Next step is to introduce the radon source to the system



Conclusion/Summary

- Gained a better understanding on many new things this summer
- Got hands on experience in chemical labs and using simple electronics
- Learned what a PID is
- In the future I would like to get a chance to use an AMS machine