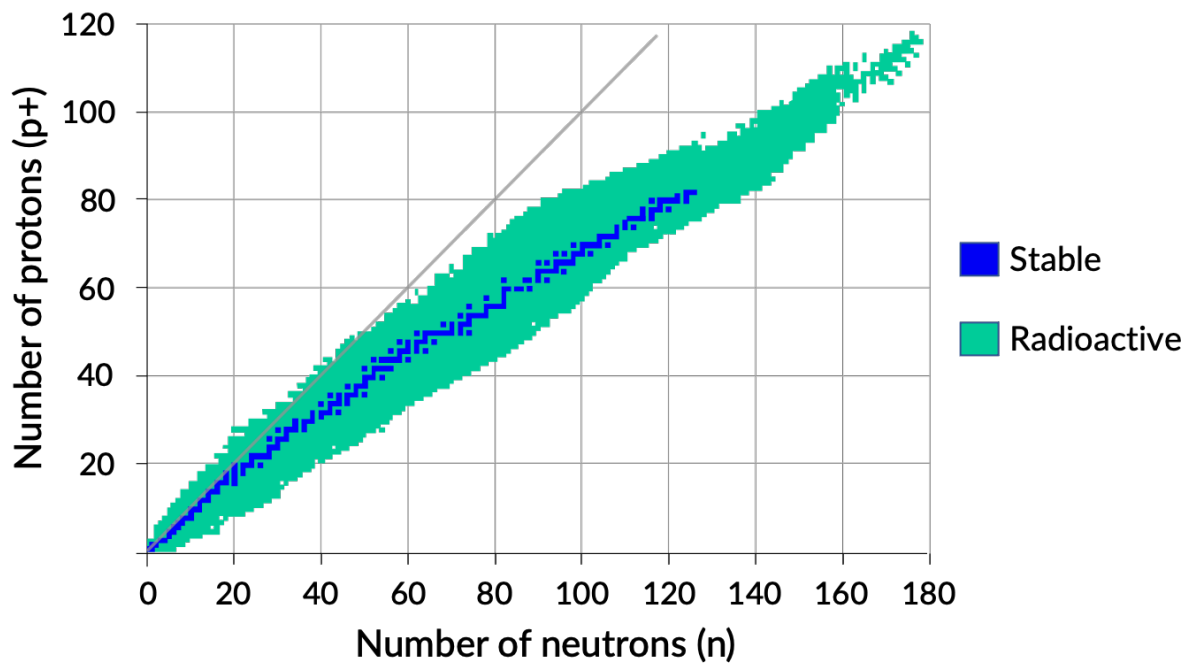


Post-Lecture #7: Production of Radioactive Materials

1. Determine the N/Z ratio for the following isotopes: U-235, U-236, Ba-144, Kr-89. Plot these isotopes on the given "line-of-stability" plot accurately and determine what the mode of decay should be for the fission fragments:



2. Which of the methods of generating radionuclides can produce carrier-free samples? Why?

3. What are the general energy restrictions for neutron activation (fast/slow) and charged particle acceleration (MeV), respectively? Where do these general requirements come from?

4. Explain the general differences between positive and negative ion cyclotrons, both in working principles and in results.

5. Describe why Moly cows are so prevalent from what we have learned in class. Why must we care about the sterility of the cow and test it so much?

6. An overworked doctor at an overbooked clinic had to take in some emergency PET scans. All of today's planned PET scans completely use up this morning's elution, leaving none for the emergency PET scans. The doctor orders you to milk the cow again, but your instincts kick in. How long should you wait since the last elution? Why? After answering the previous part, answer the following separately:

The budget is short in the clinic, and the Molybdenum sample has not been changed in about two weeks; how would this change your previous decision?