

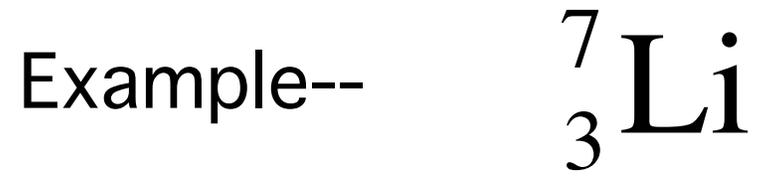
Physical Science 9
Chapter 9:
Radioactivity and Nuclear
Reactions

Section 9.1:
Radioactivity

The Nucleus of the Atom

- The nucleus is composed of protons (positive charge) and neutrons (neutral).
- The atomic number gives the number of protons in the nucleus.
- The mass number gives the number of protons + neutrons.

--Nuclear symbols are used to represent the atomic nucleus.



--The protons, with their positive charges, repel each other.

The Strong Force

- The force that holds the nucleus together is called the strong force.
- The strong force is an attraction between the protons and neutrons in the nucleus.
- The strong force is powerful when the protons and neutrons are packed closely together in the nucleus.

--The protons and neutrons in a large nucleus (with more protons) are held together less tightly than those in a small nucleus.

Binding Energy

--The strong force provides the binding energy that is needed to hold the nucleus of the atom together.

--An unstable nucleus does not have enough binding energy to hold it together.

--The strong force is not large enough to overcome the repulsive forces between the protons.

Radioactivity

--A radioactive nucleus is one that undergoes changes to become more stable.

--Radioactivity is the nuclear decay that occurs when the strong force is not large enough to hold the nucleus together.

--The nucleus changes by giving off matter and energy.

- Isotopes of an element are atoms of the same element with different numbers of neutrons in the nucleus.
- Some isotopes of the same element may be radioactive while others are not.
- A nucleus with too many or too few neutrons compared to protons is radioactive.

Discovery of Radioactivity

1896--Radioactivity of uranium was discovered by Henri Becquerel when he accidentally left an uranium salt in a desk drawer with a photographic plate.

--When the plate was developed it contained an outline of the clumps of uranium salt.

1898--Radioactive elements polonium and radium discovered by Marie & Pierre Curie.