

Naming Atoms — Elements, Ions and Isotopes

Student Activity Kit

Introduction

Use this simple and straightforward activity to help students understand the basics of a fundamental atomic concept, the nucleus and its particles.

Concepts

- Atom
- Atomic number
- Isotope
- Ion

Background

Matter is defined as any substance that has mass and occupies a volume. All matter is either a pure element or a combination of elements. Elements are matter that cannot be separated by chemical or physical means. Each element has its own unique properties, such as melting point, density, and the way it reacts chemically. There are 90 elements that are naturally occurring. The smallest part of an element that still has these same properties is called an atom. All atoms are made up of three types of particles: protons, neutrons, and electrons. The number of protons in an atom is called its *atomic number*. Every atom of each element has exactly this number of protons.

Two of these three particles possess electrical charge. The proton has a positive (+) charge, the electron has a negative (–) charge, and the neutron has no electrical charge. An atom always has equal numbers of the positively charged protons and the negatively charged electrons, giving the atom zero electrical charge.

The electrons are very mobile and can range from the center of the atom to its outer edge. The best model that represents the electrons and their movement is the electron cloud model. (See Figure 1.) Protons and neutrons are always together in the center, or *nucleus*, of the atom. (See Figure 1.) The size of the nucleus is very small and very compact when compared to the size of the atom itself. In fact, as a comparison if the nucleus were the size of a golf ball, the atom's outer edge would be 2½ miles away! A model of an atom is shown in Figure 1.

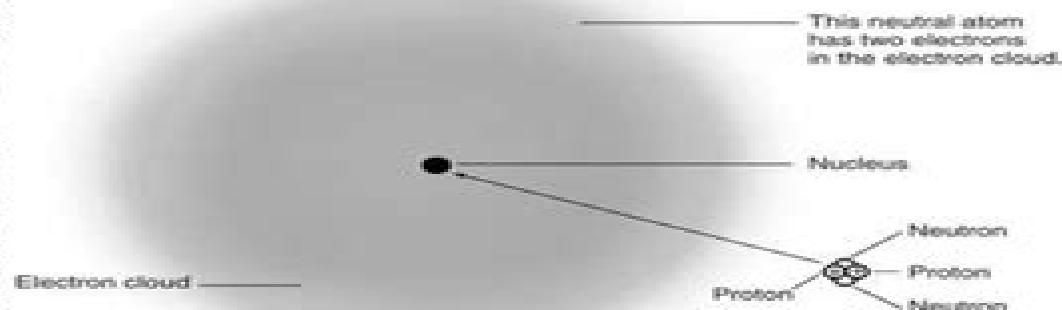


Figure 1. Electron Cloud Model of the Atom.

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