

Chapter Four: The Structure of the Atom

Section Two: Defining the Atom

Atom: the smallest particle of an element that retains the chemical properties of that element

Sir William Crookes:

- Worked with cathode ray tubes
 - Cathode rays were a stream of charged particles
 - Particles carried a negative charge
 - Conventional television is nothing more than a cathode-ray tube.

Electron: negatively charged particle = -1

JJ Thomson:

- Conducted further experiments and discovered the ratio of the negatively charged particles was the same no matter the metal used or gas in the tube
 - Determined the ratio of its charge to its mass
 - He concluded the mass was much less than that of the hydrogen atom
 - This means that Dalton was wrong in that atoms are divisible into smaller subatomic particles
- These negatively charged particles were later named electrons
 - Thomson identified the first subatomic particle – he received a Noble Prize for it.

Robert A. Millikan:

- Showed that the mass of an electron is very small
- 9.109×10^{-28} g or 1/1840 the mass of a hydrogen atom
- The charge is -1

JJ Thomson proposed a model of the atom known as the plum pudding model.

Ernest Rutherford:

- He bombarded a thin, gold foil with fast moving *alpha particles*
- He discovered the nucleus of an atom that is a very densely packed bundle of matter with a positive electric charge

James Chadwick:

- Discovered the neutron
- He received the Noble Prize for his discovery

Nucleus:

- Center of the atom
- Positively charged
- Extremely dense and small
- Most of atoms mass

Proton: subatomic particle with a positively charged particle = +1

Neutron: subatomic particle with a neutral charge (no charge) = 0

Two Regions of an atom:

1. Nucleus: very small region located near the center of an atom; consists of two particles
 - a. Protons: positively charged particles
 - b. Neutrons: neutral particles
2. Electron cloud: surrounds the nucleus and contains negatively charged particles (electrons)
 - a. move through empty space
 - b. held by its attraction to the positive nucleus

Subatomic particles: protons, neutrons, and electrons

Atoms are neutral therefore protons = electrons

Crash Course: The History of Atomic Chemistry

<https://www.youtube.com/watch?v=thnDxFdkzZs>