

## Chapter 4 Chemistry - Atomic Structure

### Historical Development:

Democritus - abt. 450 BC

Rip paper for ever?

Concept of the atom

Smallest particle of matter that retains the identity of that element

### Later Developments

Lavoisier - Conservation of mass

Joseph Proust - law of constant composition (definite proportions)

Compounds of the same type always have the same percent by mass of the same elements

John Dalton - 1803 Modern atomic theory

Postulates:

Matter is made of small particles

Atoms of a given element are identical

Atoms are not created nor destroyed in a normal chemical reaction

Given compound will always have the same number and types of atoms in small whole number ratios

In chemical reactions, atoms separate, recombine, and or rearrange

### Size of atoms

How large is an atom?    Can we see them?    What holds them together?

### Discoveries of Atomic Structure

Michael Faraday - Suggested that atoms are related to electricity somehow

Demonstrated by small bits of paper attracted to a balloon that is rubbed ( the Greeks did this with bits of amber)

Benjamin Franklin - key experiment

Concluded that matter has positive and negative charges that attract or repel

J. J. Thompson - Development of the cathode ray tube

Particles move from the cathode (- charge) to the anode (+ charge)

Measured and concluded that cathode rays were made of particles

Called them electrons

Calculated the charge to mass ratio

Robert Millikan - oil drop experiment

Used to calculate the charge on an electron

Solved for the mass of an electron

Marie and Pierre Curie - Worked with radioactive materials (hints that some atoms are not stable)

Ernest Rutherford - Gold foil experiment

Concluded that the mass of an atom was located in the center (nuclear atom)