

Atomic Structure


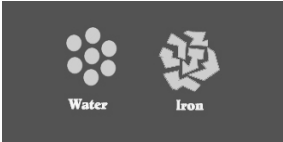
- Democritus**
- Dalton**
- JJ Thomson**
- Millikan**
- Rutherford**

1-AtomicTheoryPart1

Democritus (460 – 370 BC)


Democritus

- Greek philosopher:
- Can matter be subdivided into fundamental particles?
- All matter can be broken down into indivisible *atomos*.

According to the early theory of atoms developed by Democritus, Water atoms would be round and flow over one another while iron atoms would be jagged and stay solidly together. This is not the modern view.

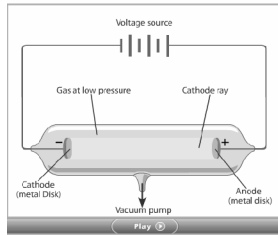
Dalton's Atomic Theory (1780)



- 1) Elements are made up of atoms
- 2) All atoms of one type are similar to one another and different from other types of atoms.
- 3) The relative number and arrangement of different types of atoms in a substance determines its identity.
- 4) Chemical change is a union, separation, or rearrangement of atoms to give new substances.
- 5) Only whole atoms can participate in or result from a chemical change, since atoms are indestructible during such changes.

Experiments to determine the structure of an atom

- J. J. Thomson- used Cathode ray tubes

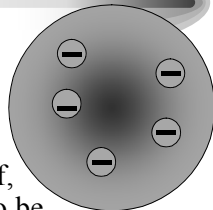


Thomson's Experiment

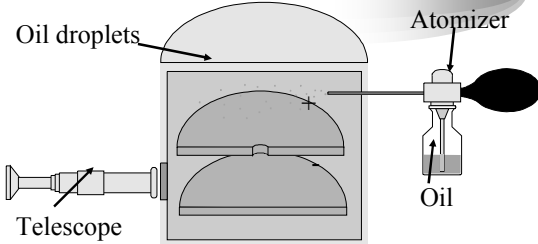
- By adding an electric field, he found that the moving pieces were negatively charged.
- He measured the electron's charge to mass ratio.
- And identified the electron as a fundamental particle

J.J. Thomson's Model

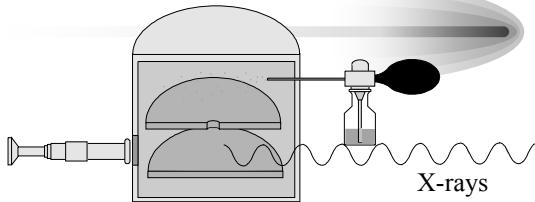
- Found the electron.
- Said the atom was like plum pudding.
- A bunch of positive stuff, with the electrons able to be removed.



Robert Millikan Experiment 1917



Millikan's Experiment

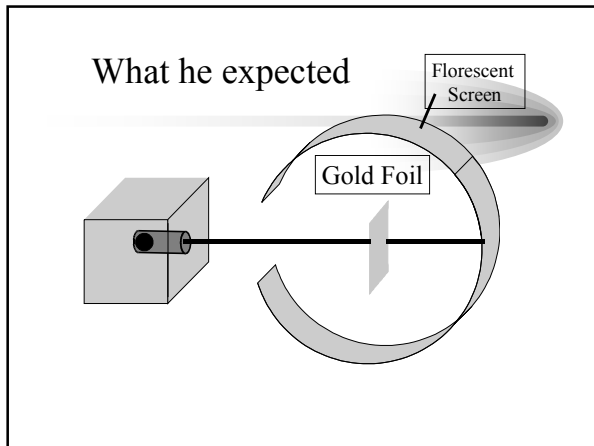


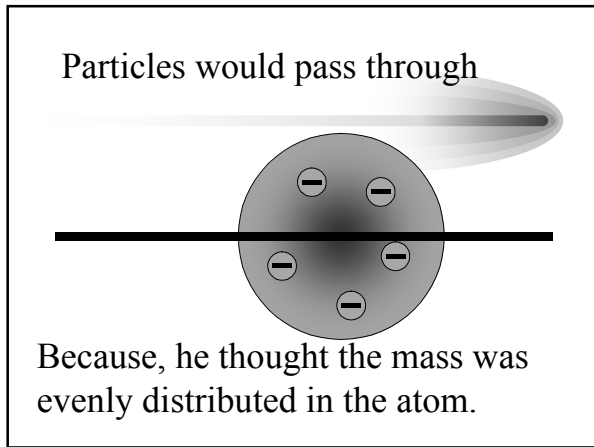
X-rays gave some electrons a charge and Millikan found that these drops would hover.

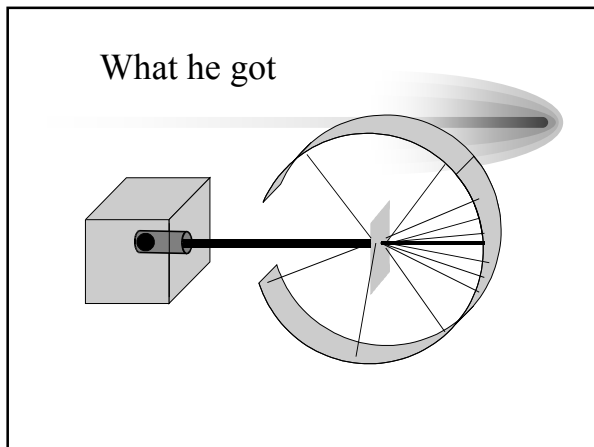
From the mass of the drop and the charge on the plates, he calculated the mass of an electron.

Rutherford's Experiment 1907

- Aimed alpha particles at gold foil by drilling a hole in a lead block.
- Since the mass is evenly distributed in gold atoms, alpha particles should go straight through.
- Used gold foil because it could be made atoms thin.

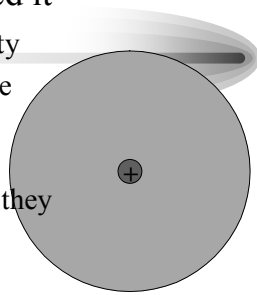




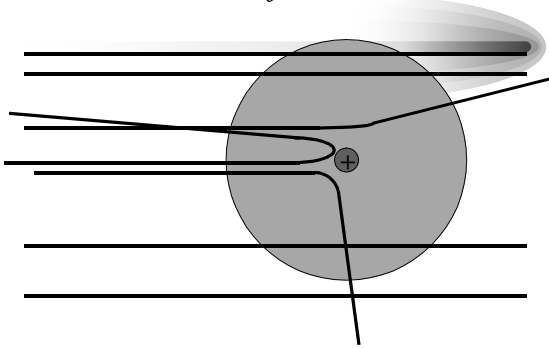


How he explained it

- Atom is mostly empty
- Small dense, positive piece at center.
- Alpha particles are deflected by it if they get close enough.



What Rutherford Observed



*SO THERE MUST BE
A SMALL MASSIVE CENTER!!!*

**THE
NUCLEUS**

Summary

Democritus – concepts of atoms

Dalton – atoms have certain properties

- Elements are made of atoms
- Atoms of one element are all the same
- Atoms of one element are different from those of another
- The number of different atoms and way atoms combine determine the identity of a substance
- Only whole atoms can combine to form substances

JJ Thomson – atoms have electrons

Millikan – proved electrons exist

Rutherford – discovered the nucleus

1-AtomicTheoryPart1
