

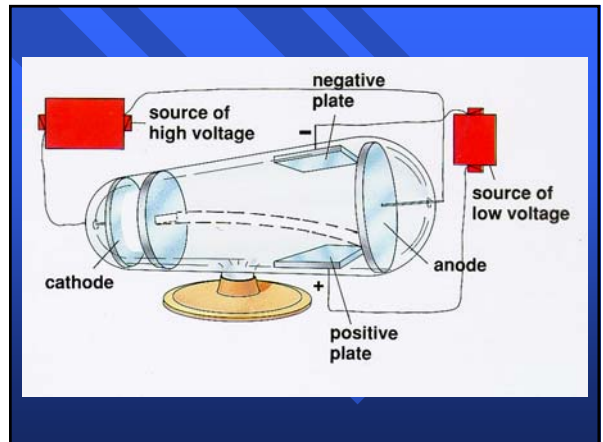
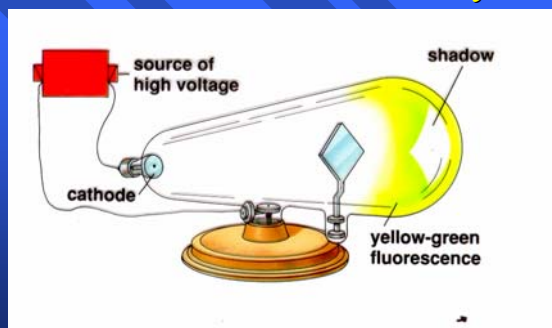
## Models of the Atom

Dalton, Thomson and Rutherford

## John Dalton (1803)

- Based on the way that elements combined in compounds, Dalton concluded that atoms were the smallest possible particle of matter.
- This view of the atom was expressed by Greek **philosophers** at least 2000 years earlier.
- Dalton was the first to find **experimental** support for this belief.

## J.J. Thomson's Cathode Ray



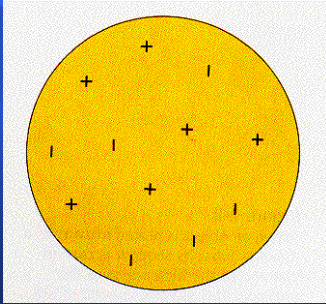
## Atoms Are Not the Smallest Particle of Matter

- In Thomson's experiments, the rays **always** behaved the same regardless of what type of element was used for the gas or cathode.
- The particles making up these rays seemed to be a common denominator for all elements.
- Since atoms differed from element to element, this common denominator must be an even more fundamental particle than the atom.

## Thomson's "Plum Pudding" Model

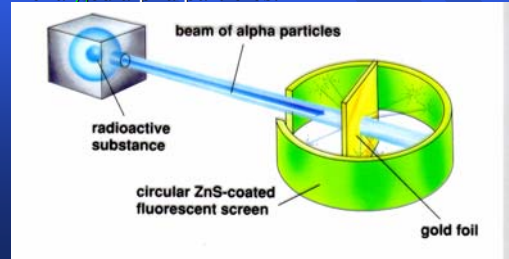
- The particles making up the rays acted as if they were **negatively** charged.
- Since elements are neutral, there must be positive particles balancing out the negative particles.
- Thomson theorized that an atom consisted of a "pudding" of evenly distributed positive and negative particles.

## Plum Pudding

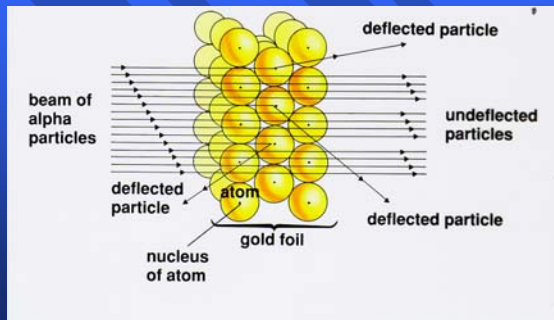


## Ernest Rutherford (1909)

- Bombarded a thin metal foil with **positively-charged** alpha particles.



## What Rutherford Saw



- Most particles flew right through the foil as if there were nothing there
  - **The foil was mostly empty space**
- A small number of particles were bounced back to their source
  - **There must be a small, dense nucleus with a positive charge**

## The Rutherford Model of the Atom

- A dense, positively-charged nucleus
- Negatively-charged electrons orbiting the nucleus

## Subatomic Particles

	Proton	Electron	Neutron
Symbol	p+	e-	n
Charge	+1	-1	0
Mass (amu)	1	1/1837	1