


Atomic Theory

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Dalton's Model



http://www.sciencemuseum.org.uk/images/object_images/535x535/10312949.jpg

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John Dalton

- ~1800
- Atoms of same element are identical
- Atoms combine and mix in whole number ratios
- Chem rxns occur when atoms joined, separated, rearranged
- Cannot change atoms of one element into another element

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Thomson's Plum Pudding Model

positively charged matter

electrons

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Thomson's Plum Pudding Model

Christmas Plum Pudding.

Fashion-era.com

J.J. Thomson

- 1897
- Discovered electrons using cathode rays
- Determined atoms have negative particles

High voltage

Slit

Positive plate

Cathode

Vacuum pump

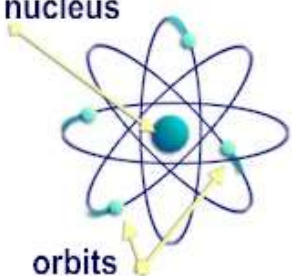
Negative plate

Anode

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Rutherford's Model

nucleus

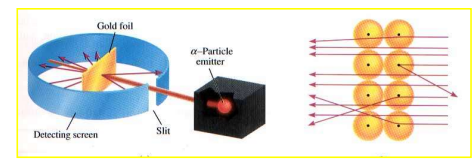


orbits

<http://www.epa.gov/radiation/understand/rutherford.html>

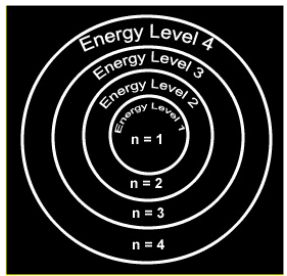
Ernest Rutherford

- 1911
- Discovered nucleus
- Gold foil experiment



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Bohr's Model



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Niels Bohr

- 1913
- Electrons are only in specific paths around nucleus
- Orbits have fixed energies

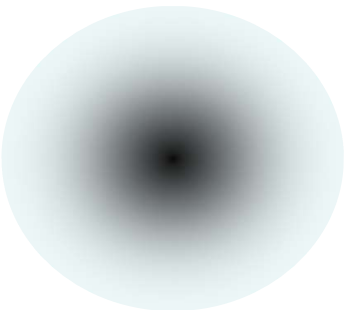


Discovery
EDUCATION

- Don't worry about Plank—don't need to know

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Quantum Mechanical Model
Electron Cloud Model



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Erwin Schrödinger

- 1926
- Develops mathematical equation to describe motion of electrons
- Electrons have allowed energies
- Probability of finding electron in space

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Schrödinger equation

$$i\hbar \frac{\partial \psi(\mathbf{r}, t)}{\partial t} = -\frac{\hbar^2}{2m} \nabla^2 \psi(\mathbf{r}, t) + V(\mathbf{r})\psi(\mathbf{r}, t)$$

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James Chadwick

- 1932
- Confirms existence of neutrons

