

## Introduction for Module 2 – Atomic Discovery

Textbook: [Open Stax Chemistry 2e](#)

Suggested Reading: Chapter [2.1-2.3](#) (Especially. [2.3](#))

Learning Objectives:

- **State the parts of the atom, and their fundamental properties (charge, mass)**
- **Recognize the pathway science has taken towards achieving this understanding**
- **Explain the main achievements and discoveries of the achievements of Dalton, Thompson, Rutherford and Millikan**

Captions and Attributions:

- 1) Carbon Oxide (CO) and Carbon Dioxide (CO<sub>2</sub>) illustrate the law of multiple proportions: that elements can combine in more than one whole numbered ratio.
- 2) Thompson's experiments with cathode ray tubes gained insight to a negatively charged particle that was universal to all substances. This particle would become known as the electron. [Figure 2.6c, J.J. Thompson produced a visible beam](#) by [Open Stax](#) is licensed under [CC BY 4.0](#).
- 3) A schematic of Rutherford's experiment with alpha particles and gold foil demonstrates surprising results: particles mostly pass through but are also deflected and rebounded by positively charged centers that would become known as the nucleus. [Figure 2.9, Geiger and Rutherford fired](#) by [Open Stax](#) is licensed under [CC BY 4.0](#).
- 4) Importantly, the gold foil is very thin – hopefully only a few atoms. By doing so, most particles pass right through without hitting a nucleus. [Figure 2.10, The alpha particles are deflected](#) by [Open Stax](#) is licensed under [CC BY 4.0](#).
- 5) Milikan's experiment is shown in steps - oil drops were irradiated which caused random (but whole number values) of electrons to be added. Change in force each droplet feels due to electrical field can be measured and observed. Milikan's Experiment Diagram (c) 2020 used with permission of Becca Edwards
- 6) Millikan's oil drop experiment was able to determine the charge of an electron, due to only whole numbers of electrons applied to each water drop. [Figure 2.7, Millikan's experiment measured](#) by [Open Stax](#) is licensed under [CC BY 4.0](#).



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