

Cycle 2 Chemistry I Lesson 3

Atomic Models

Agenda:

Atomic Models Packet (use Periodic Table!)

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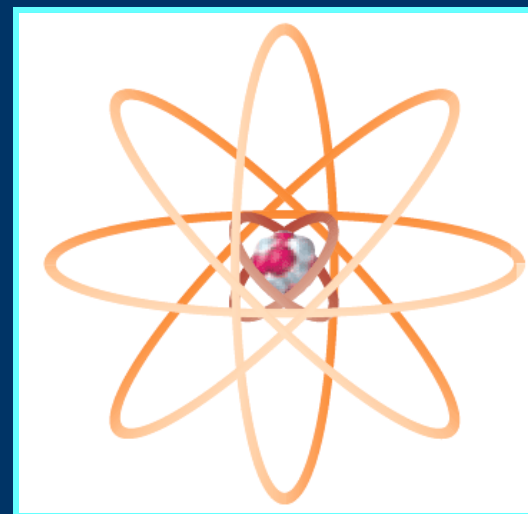


Atomic Models, *continued*

Bohr's Model Confines Electrons to Energy Levels



- Rutherford's model of an atom
 - electrons orbit the nucleus just as planets orbit the sun



- Bohr's model of an atom
 - electrons travel around the nucleus in specific energy levels



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Comparing Models of Atoms

Rutherford's Model

Electrons

Nucleus

Click a thumbnail image to learn more.

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Electrons and Light, *continued* Light Emission

- When a high-voltage current is passed through a tube of hydrogen gas at low pressure, lavender-colored light is seen. When this light passes through a prism, you can see that the light is made of only a few colors. This spectrum of a few colors is called a *line-emission spectrum*.
- Experiments with other gaseous elements show that each element has a line-emission spectrum that is made of a different pattern of colors.





Electrons and Light, *continued* Light Emission, *continued*

- In 1913, Bohr showed that hydrogen's line-emission spectrum could be explained by assuming that the hydrogen atom's electron can be in any one of a number of distinct energy levels.
 - An electron can move from a low energy level to a high energy level by absorbing energy.
 - Electrons at a higher energy level are unstable and can move to a lower energy level by releasing energy. This energy is released as light that has a specific wavelength.
 - Each different move from a particular energy level to a lower energy level will release light of a different wavelength.



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Electrons and Light, *continued*

Light Provides Information About Electrons

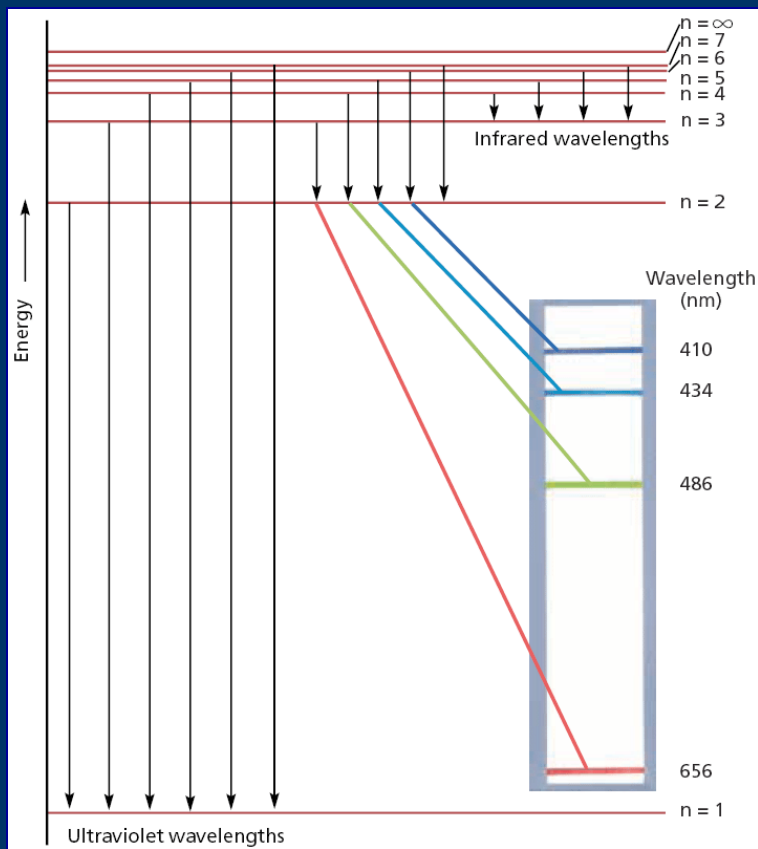
- An electron in a state of its lowest possible energy, is in a **ground state**.
 - The ground state is the lowest energy state of a quantized system
- If an electron gains energy, it moves to an **excited state**.
 - An excited state is a state in which an atom has more energy than it does at its ground state
- An electron in an excited state will release a specific quantity of energy as it quickly “falls” back to its ground state.





Electrons and Light, *continued*

Light Provides Information About Electrons, *continued*

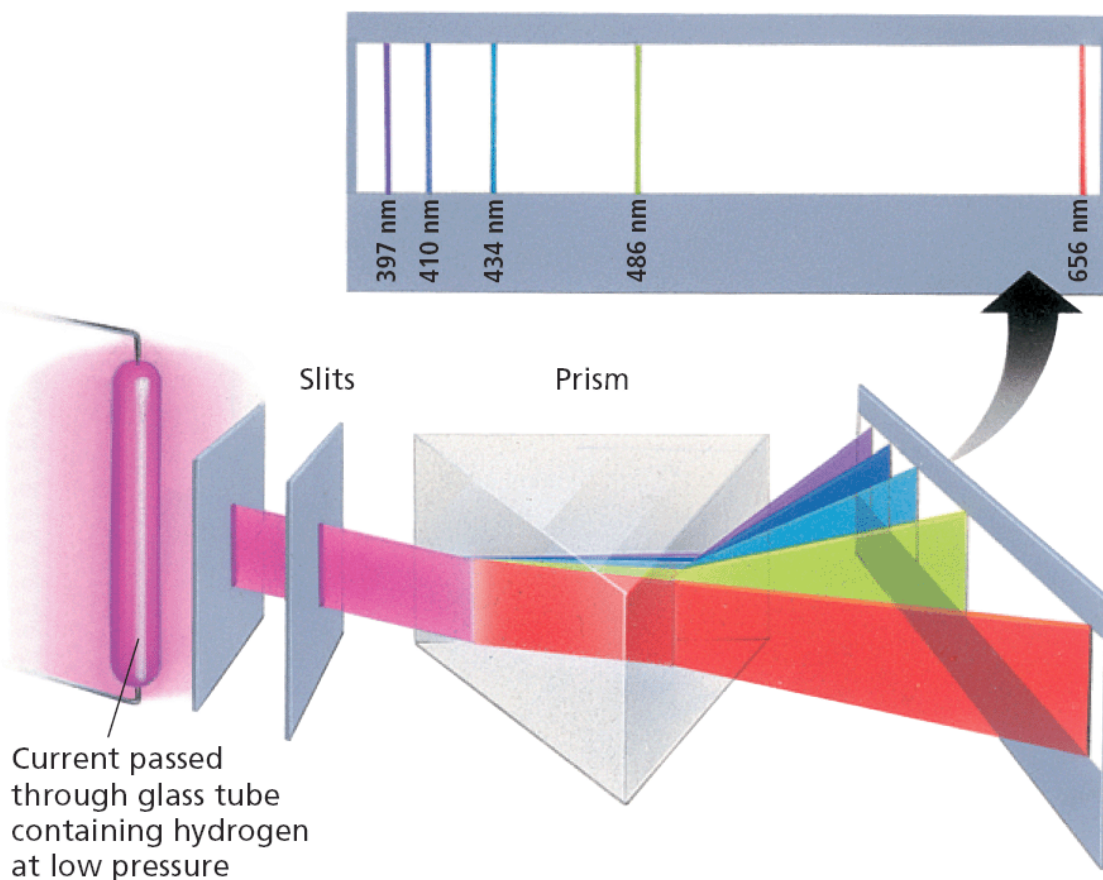


- An electron in a hydrogen atom can move between only certain energy states, shown as $n = 1$ to $n = 7$.
- In dropping from a higher energy state to a lower energy state, an electron emits a characteristic wavelength of light.

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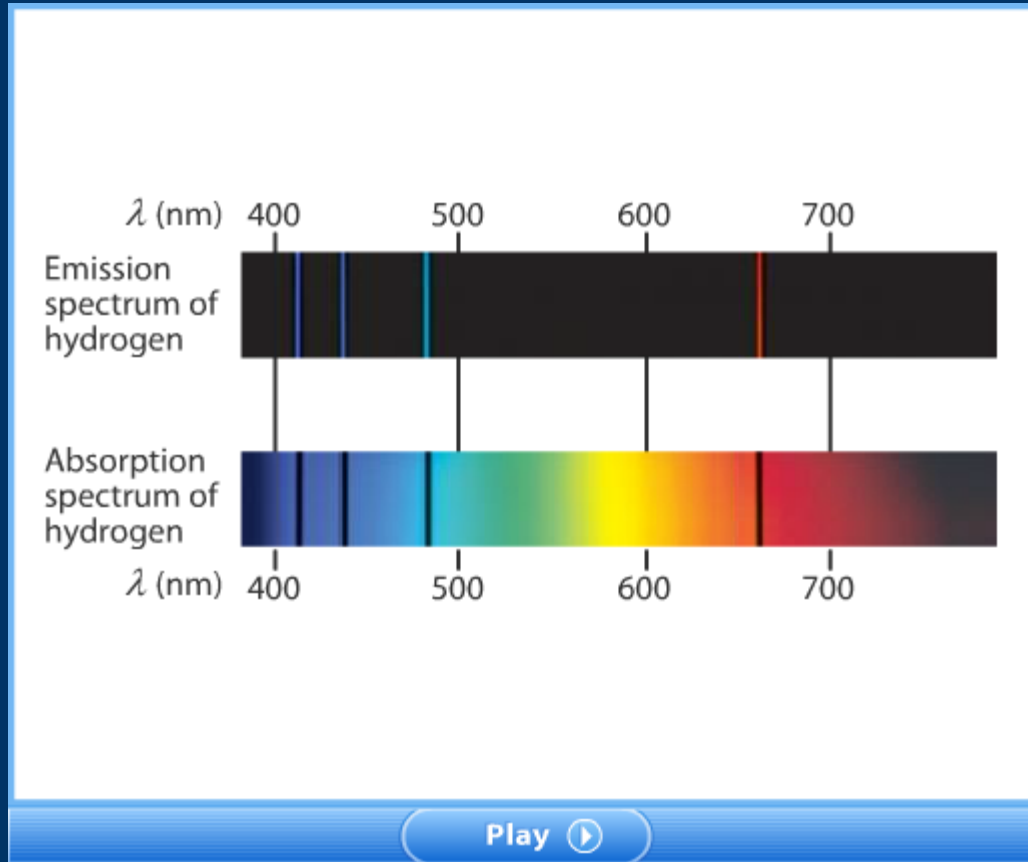
Hydrogen's Line-Emission Spectrum



Excited hydrogen atoms emit a pinkish glow. When the visible portion of the emitted light is passed through a prism, it is separated into specific wavelengths that are part of hydrogen's line-emission spectrum.



Absorption and Emission Spectra



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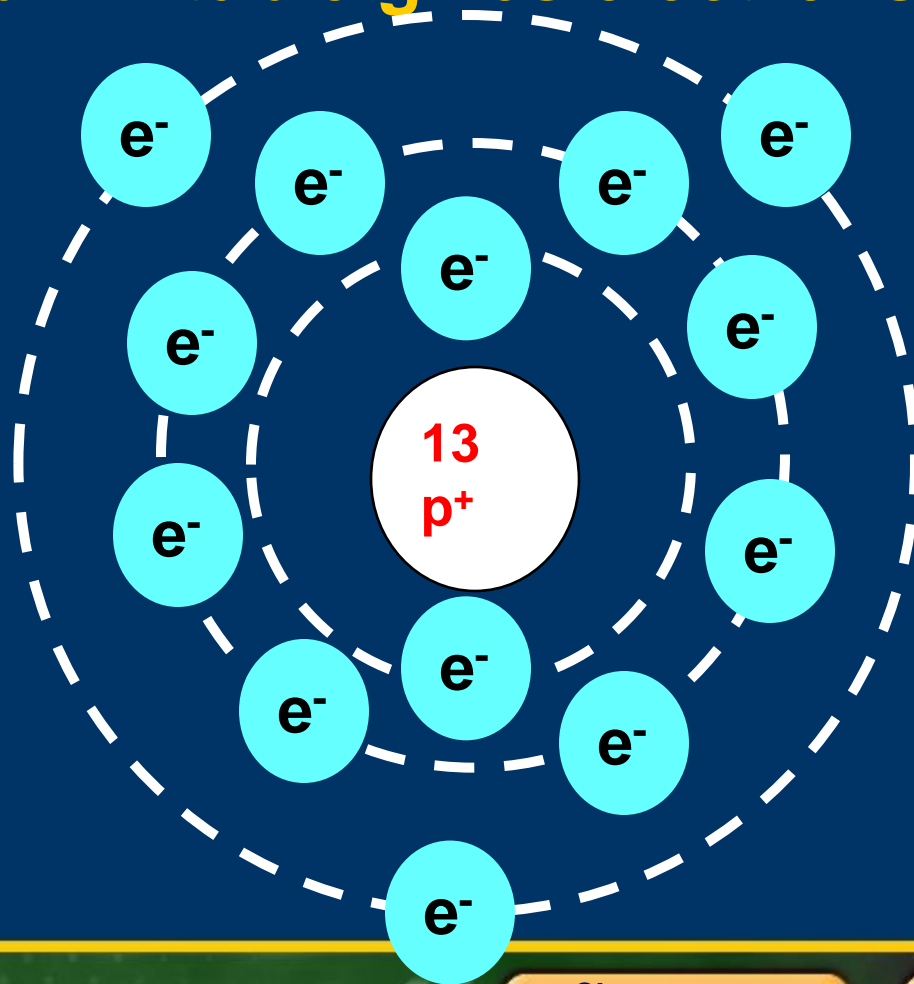
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Bohr Model as WE use it
Aluminum – table gives electrons as 2-8-3...



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