**Chapter 5- Quantum**

* 1. **Revising Atomic Model**

**Rutherford’s Model and Its Limitations**

You learned in chapter 4 that Rutherford concluded that the atom has a positively charged nucleus with electrons around it

His model failed to talk about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_like why metals changed colors when heated

His student, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, developed a new atomic model to explain these chemical properties

**Niels Bohr**

**Bohr’s Model**

Each electron has a fixed energy, called\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Electrons can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_energy levels just like how we can move up and down a ladder

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the amount of energy required to move up or down an energy level

**Limitations to Bohr’s Model**

Although, Bohr’s model explains the path of the electrons around the nucleus, later calculations failed to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_used mathematics to better explain Bohr’s atomic model (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

Determines \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and how likely it is to find \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_around the nucleus

**Atomic Orbitals**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: describes probability of finding an electron at various locations around the nucleus

Energy levels are labeled in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(n) representing the energy levels

When\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, there are more orbitals with different shapes that shows where the electrons can be found

**Sub-Orbital Shapes**

**Summary of Principle Energy Levels and Sublevels**

|  |  |  |  |
| --- | --- | --- | --- |
| Quantum Principle Number (n) | Number of Sublevels | Types of Sublevels | Maximum Number of Electrons |
|  | 1 |  | 2 |
|  | 2 | 2s, 2p | 8 |
| 3 | 3 |  |  |
|  | 4 | 4s,4p,4d,4f |  |