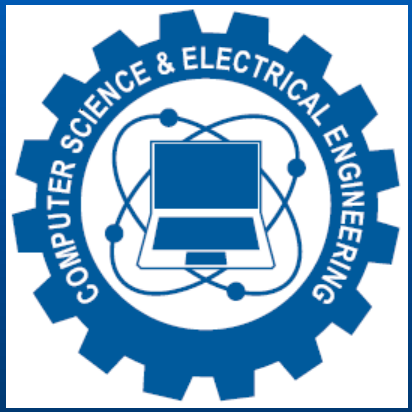
Atomic Structure



The Atom

- Smallest particle of an ***element*** that retains the characteristics of that element.
- Has a central ***nucleus*.**
- Nucleus contains ***protons*** which are positively charged particles and ***neutrons*** which are uncharged particles.
- Orbiting around the nucleus are negatively charged particles called ***electrons***.

The Atom (cont'd)

- ***Orbits*** correspond to energy levels.
- Energy levels are grouped into energy bands and are referred to as ***shells***.
- Shells are designated as 1,2,3, etc.
- Shells have a fixed maximum number of orbiting electrons.

The Atom (cont'd)

- Electrons orbiting in shell 1 have less energy and are more closely held to the nucleus than electrons orbiting in shell 4.
- ***Force of attraction*** between the positively charged protons and negatively charged electrons decreases with increased distance from the nucleus.
- Shell 4 is the ***valence*** shell, and electrons there are loosely held.

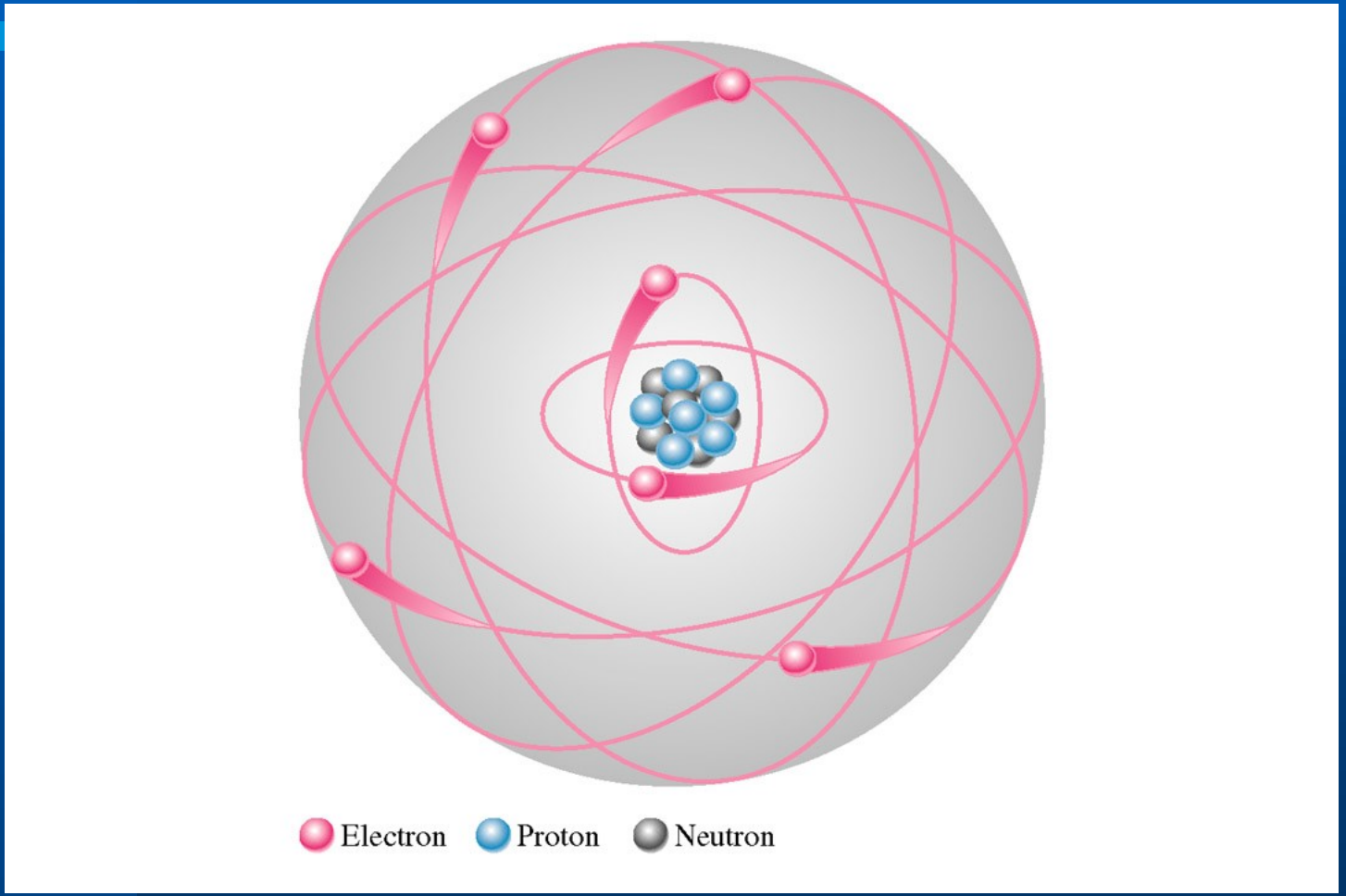
The Atom (cont'd)

- Electrons in the valence band are called ***valence electrons***.
- Valence electrons contribute to chemical reactions and bonding within the structure of a material.
- If a valence electron escapes an atom, the escaped valence electron a ***free electron***.
- An atom with a missing electron is called an ***ion***.

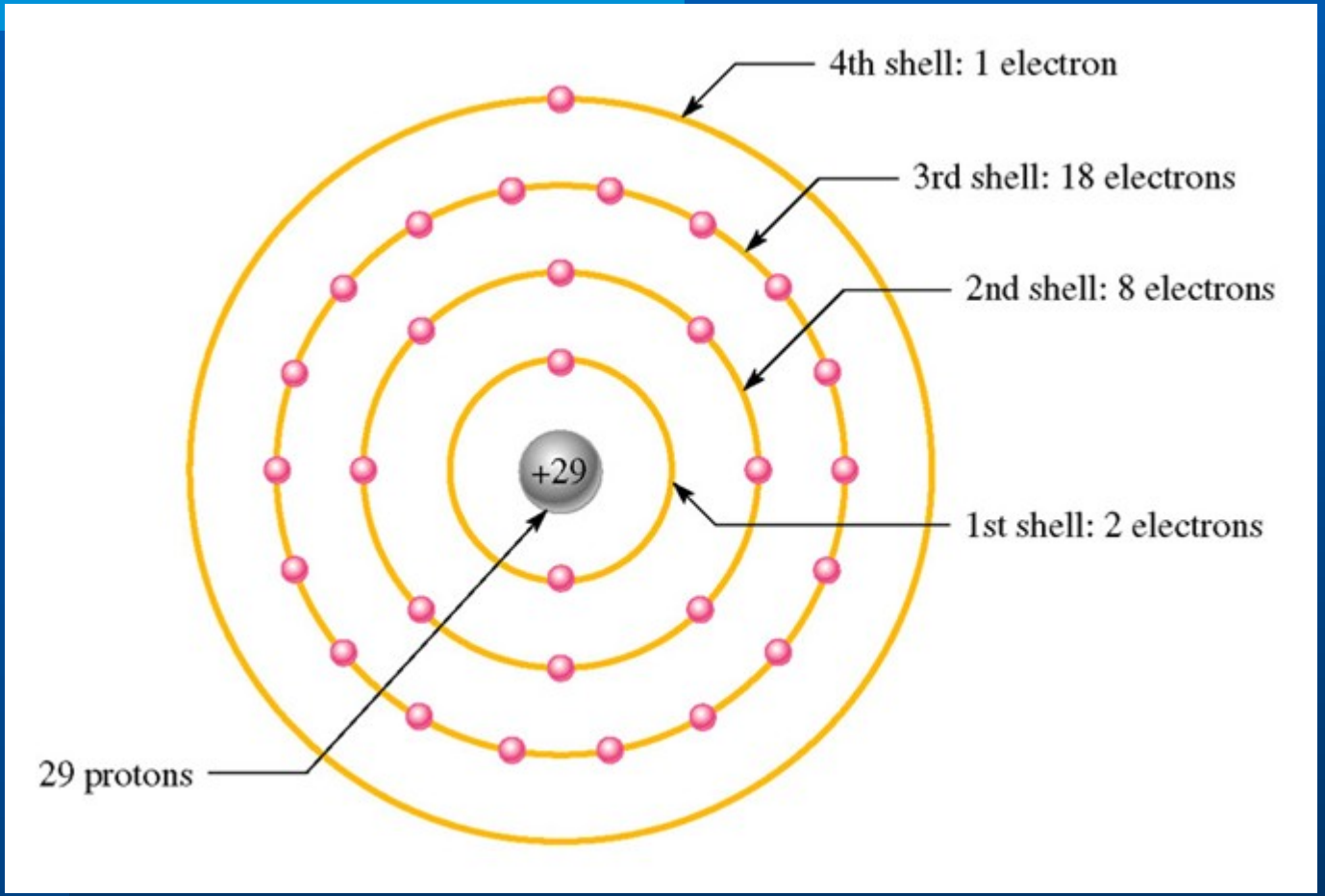
The Atom (cont'd)

- Elements have an ***atomic number*** associated with it.
- Atomic number is based on the number of protons in the atom's nucleus.
- Elements are arranged based on their atomic number (***Periodic Table***).
- The Bohr model is used to represent the atom of any element.

The Bohr Model



Copper Atom


4th shell: 1 electron
3rd shell: 18 electrons
2nd shell: 8 electrons
+29
1st shell: 2 electrons
29 protons