

## Using Electron Configurations to Understand Atoms (Honors Chemistry)

Write the Electron Configurations for the following atoms and then answer the questions

### Vanadium (23 electrons)



1. Highest full Energy level? **second**
2. Highest full sublevel? **4s**
3. Highest occupied Energy level? **4<sup>th</sup>**
4. Number of unpaired electrons? **3**
5. Number of empty orbitals? **2**

### Arsenic (33 electrons)



1. Highest full Energy level? **third**
2. Highest full sublevel? **3d**
3. Highest occupied Energy level? **4<sup>th</sup>**
4. Number of unpaired electrons? **3**
5. Number of empty orbitals? **0**

### Silver (47 electrons)



1. Highest full Energy level? **third**
2. Highest full sublevel? **5s**
3. Highest occupied Energy level? **5<sup>th</sup>**
4. Number of unpaired electrons? **1**
5. Number of empty orbitals? **0**

Identify the elements described below:

- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$  **Chromium**
- Contains the first *d* electron of any atom **Scandium**
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$  **Arsenic**
- Contains 1 electron in the 4s sublevel **Potassium**
- Contains 15 electrons in the 3<sup>rd</sup> energy level, but has 2 electrons in the 4<sup>th</sup> energy level **Cobalt**
- Contains the first *p* electron of any atom **Boron**
- $1s^2 2s^2 2p^6 3s^2 3p^3$  **Phosphorus**
- Contains four electrons in its 2*p* sublevel **Oxygen**

Explain why the 5s sublevel fills before the 4d sublevel begins to fill as electrons are added.

1. The 5s is closer to the nucleus than the 4d.
2. The 5s has less energy than the 4d.
3. The 4<sup>th</sup> and 5<sup>th</sup> energy levels overlap each other.

Which sublevel(s) does Hund's Rule not apply to? Explain your answer.

**The "s" sublevel because there is only one orbital. Hund's rule only applies to the p, d, & f sublevels because they have multiple orbitals with equal energy.**