

Noble Gas Configuration Notation

1. Noble gas configuration is a shorthand way of writing electron configuration
2. The six noble gases are found in column 18 of the period table. All noble gases have the maximum number of electrons possible in their outer shell, making them stable. Because each noble gas is found at the end of a row, we can use them as a short cut when writing electron configuration.
3. To write noble gas notation, find the noble gas on the row before the element you are looking for. Place the noble gas in brackets [], and then complete the rest of the notation until the element.
4. Example: sodium
 - a. Sodium has an atomic number of 11
 - b. It is located on the 3rd row of the chart → 3rd main energy level
 - c. It is located in the 1st column, which means it is in the s sublevel
 - d. It has 11 electrons
 - e. The noble gas located immediately before sodium (one row up at the end of the row) is neon (Ne)
 - f. We know the electron configuration for sodium is: $1s^2 2s^2 2p^6 3s^1$
 - g. If the electron configuration for Ne is $1s^2 2s^2 2p^6$, then we can use neon to represent that part of the configuration!
 - h. The noble gas notation for sodium would be: $[\text{Ne}]3s^1$
5. Write the noble gas configuration for each of the following elements:
 - a. S
 - b. Sb
 - c. W
 - d. Rb
 - e. At
 - f. U

In Addition ...

1. You must not only be able to write each type of notation, but you also need to be able to read it!
2. Identify the following elements and the number of valence electrons based on their notations:

a. $\uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow \quad \uparrow$

b. $\uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow$

c. $\uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow$

d. $\uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow$

$\uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow\downarrow \quad \uparrow$

e. $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow$ \uparrow \uparrow \uparrow

f. $1s^2 2s^2 2p^6 3s^1$

g. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$

h. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 5d^4$

i. $1s^2 2s^2 2p^6 3s^2 3p^2$

j. $[\text{Ar}] 4s^2 3d^1$

k. $[\text{Xe}] 6s^1$

l. $[\text{Kr}] 5s^2 4d^{10} 5p^2$