

## Answer on Question #41306 – Chemistry – Organic Chemistry

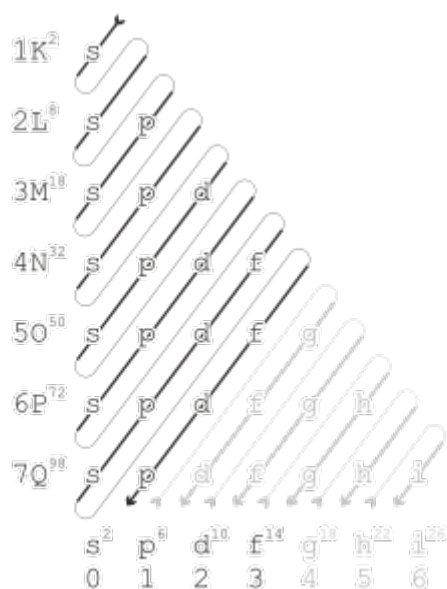
### Question:

Explain why all the periods of the periodic table did not comprise the same number of elements.

### Answer:

Each element in periodic table is placed by the increasing of the number of protons in its nuclei. The number of electrons naturally increases by one with the increasing of the number of protons by one.

Modern quantum mechanics explains these periodic trends in properties in terms of electron shells. As atomic number increases, shells fill with electrons in approximately the order shown down at the scheme. The filling of each shell corresponds to a row in the table.



The number of the period is called the principal quantum number **N**. Number of electrons that can occupy the energy level with principal quantum number **N** can be generally expressed as  $n = 2N^2$  (1)

**The general number of electrons is equal to the number of elements in the period.**

In that case, the general number of electrons for

<b>N = 1</b>	<b><math>n = 2 \cdot 1^2 = 2</math></b>
<b>N = 2</b>	<b><math>n = 2 \cdot 2^2 = 8</math></b>
<b>N = 3</b>	<b><math>n = 2 \cdot 3^2 = 18</math></b>
<b>N = 4</b>	<b><math>n = 2 \cdot 4^2 = 32</math></b>
<b>N = 5</b>	<b><math>n = 2 \cdot 5^2 = 50</math></b>
<b>N = 6</b>	<b><math>n = 2 \cdot 6^2 = 72</math></b>
<b>N = 7</b>	<b><math>n = 2 \cdot 7^2 = 98</math></b>

That is why the first period contains only 2 elements (H and He), second period contains 8 elements and so on.