

Electronic Structure of Atoms

Four quantum numbers characterize the electron :

- 1) principal $n = 1, 2, 3, 4, \dots$;
- 2) orbital (angular) $l = 0, 1, 2, \dots, (n - 1)$;
- 3) magnetic $m = 0, \pm 1, \dots, \pm l$;
- 4) spin $S = +1/2, -1/2$.

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The energy depends on n

The set of electrons having the same principal quantum number n is called a *shell*. Shells are subdivided into subshells, which have different quantum numbers l .

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The following notation is convenient

Quantum number n	1	2	3	4	5	6	7
Symbol	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>P</i>	<i>Q</i>

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Inside shell, the electrons with different angular numbers l build up subshells:

Angular momentum, l	0	1	2	3	4	5
Symbol	<i>s</i>	<i>p</i>	<i>d</i>	<i>f</i>	<i>g</i>	<i>h</i>

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Pauli's exclusion principle states that no two electrons in an atom may have same set of quantum numbers. . .

In accordance with this principle in a state characterized by three quantum numbers n , l , and m , no more than two electrons with opposite spins can be found.

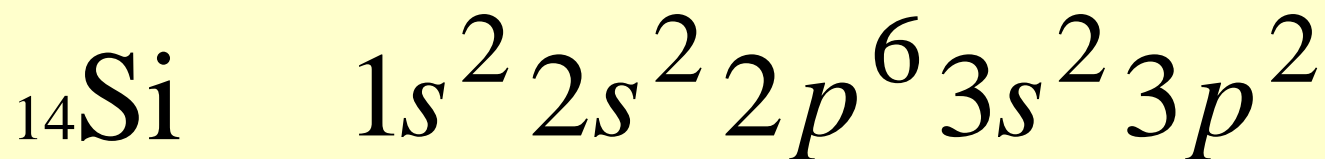
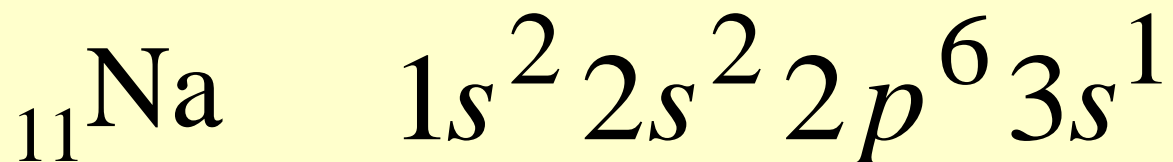
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There are: two electrons in K – shell, eight electrons in L – shell, eighteen electrons in M – shell, and so on.

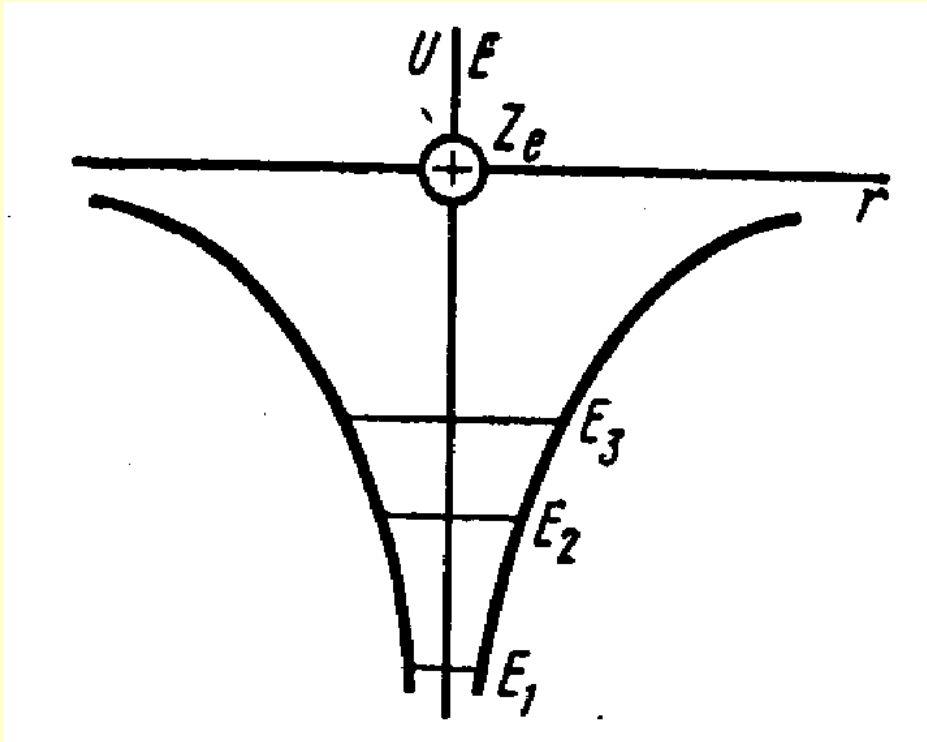
There are: two electrons in s – subshell, six electrons in p – subshell, ten electrons in d – subshell and so on.

Electronic Structure of Atom

The electron configuration of elements



Electronic Structure of Atom



The potential well of an isolated atom and energy levels of electrons