

Organic Chemistry Fundamentals (Speedy Study Guides)


Speedy Study Guides

ORGANIC CHEMISTRY FUNDAMENTALS

ELECTRONIC STRUCTURE AND ATOMIC ORBITALS

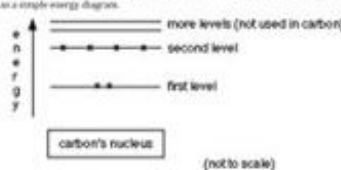
A simple view

In any introductory chemistry course you will have come across the electronic structures of hydrogen and carbon shown as:



Note: There are many places where you could well make use of this model of the atom as it is, however, a simplification and can be misleading. It gives the impression that the electrons are circling the nucleus in orbits like planets around the sun. As you will see in a moment, it is impossible to know exactly how they are actually moving.

The circles show energy levels - representing increasing distance from the nucleus. You could straighten the circles out and draw the electronic structure as a simple energy diagram.



Atomic orbitals

Orbits and orbitals sound similar, but they have quite different meanings. It is essential that you understand the difference between them.

The impossibility of drawing orbits for electrons

To plot a path for something you need to know exactly where the object is and be able to work out exactly where it's going to be an instant later. You can't do this for electrons.

Note: In order to plot a plane's course, it is no use knowing its exact location in real distance (you don't know its altitude or speed). Equally it's no use knowing that it is travelling at 500 mph due west if you have no idea whether it is near behind or the doors of that particular moment.

The Heisenberg Uncertainty Principle (not required at A-level) says - basically - that you can't know with certainty both where an electron is and where it's going next. That makes it impossible to plot an orbit for an electron around a nucleus. In this a big problem! So, if something is impossible, you have to accept it and find a way around it.

Hydrogen's electron - the 1s orbital

Note: In this diagram (and the orbital diagrams that follow), the nucleus is shown very much larger than it really is. This is just for clarity.

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Reviews

An extremely amazing publication with lucid and perfect answers. It is written in easy phrases instead of confusing. I am just very happy to inform you that this is the best pdf we have read in my own daily life and can be the greatest publication for at any time.

(Mrs. Madonna Bosco)

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