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CHEMISTRY 4/2

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INFO

This is a study sheet by Linus Metzler about Chemistry 4/2, which was mentioned in the 2nd Kanti at Mr. Uetz.
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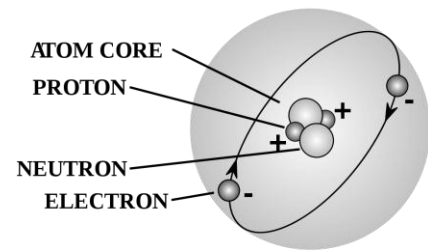
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STUDY PART

YOU KNOW WHAT ATOMS ARE COMPOSED OF

Atoms are composed of protons (nucleus; positive), neutrons (nucleus; neutral) and electrons (shell; negative).



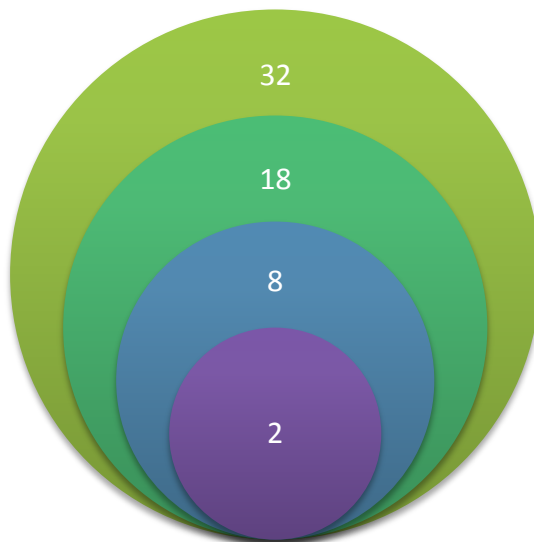
The electrons are extremely far away from the nucleus – if Mr. Uetz's was the nucleus, the electron would be at Uttwil.

YOU KNOW THE STRUCTURE OF THE NUCLEUS OF THE ATOMS AND KNOW THE CONNECTION BETWEEN THE STRUCTURE OF THE NUCLEUS AND THE PERIODIC TABLE OF THE ELEMENTS

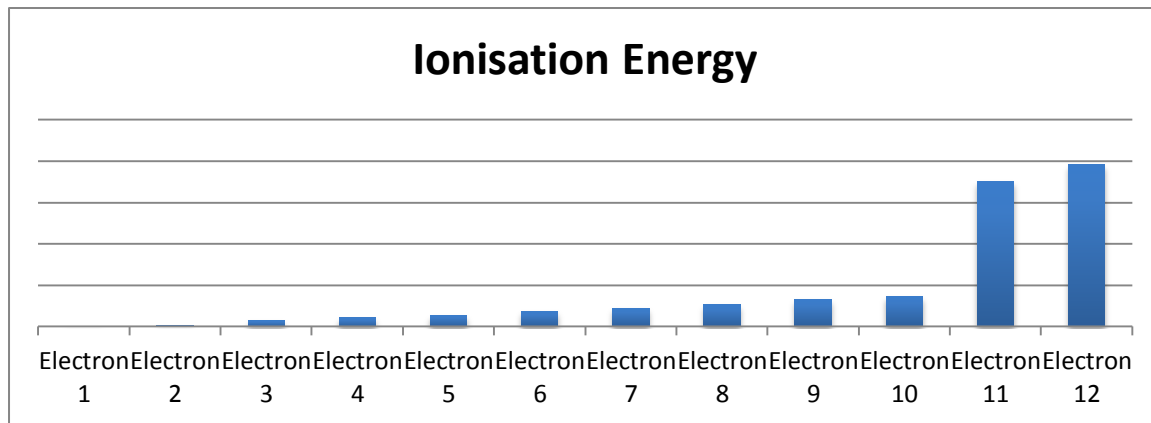
The periodic table is sorted by the number of protons (Ordnungszahl). The mass is calculated by the number of electrons and protons as well as with the neutrons (which have the same mass as the protons).

YOU KNOW THE STRUCTURE OF THE ATOM IN THE SHELL MODEL AND YOU ARE ABLE TO DRAW ANY ATOM OF THE MAIN GROUP ELEMENTS IN THE SHELL MODEL

The **ELECTRONS** are organized in different shells, where each shell can contain a maximum of electrons. You can calculate the number of electrons by using this formula $e^- = 2n^2$



By taking electrons away from the atom in reactions, you encounter difficulties (read: need more energy) when you enter inner shell – for the Magnesium this looks as follow. (Look at the jump between electron 2 and 3 and 10 and 11)



YOU CAN EXPLAIN WHY MELTED SALT CAN CONDUCT ELECTRIC CURRENT

A salt is stable crystal compound whereas when melted the ions can move and hereby conduct electricity.

YOU CAN EXPLAIN WHICH CHARGE A SODIUM ION AND A CHLORIDE ION HAVE

RULE: METALS (WHEN AS ION) ARE POSITIVE, NON-METALS (WHEN AS ION) ARE NEGATIVE

For the sodium it's far easier to give away one electron than gaining seven to have a complete outer shell. For the chlorine – in contrary – it's relatively easy to gain one electron rather having to give away seven electrons.

YOU KNOW HOW TO EXPLAIN THE FORCE BETWEEN THE IONS IN A SALT CRYSTAL

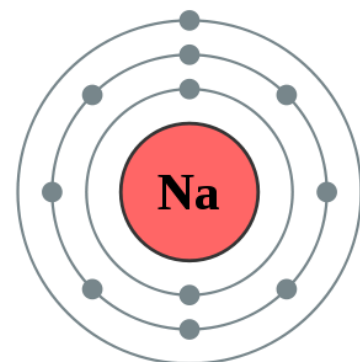
The different charged ions attract each other.

YOU CAN DESCRIBE IN DETAILS HOW NaCl IS FORMED IN A REACTION OF SODIUM (Na) AND CHLORINE (Cl)

An electron from the sodium atom goes to the chlorine atom.

YOU KNOW THE EXPRESSION OUTER SHELL ELECTRONS AND ARE ABLE TO DRAW THE ELECTRON DIAGRAM FOR ALL GROUP ELEMENT

The **OUTER SHELL ELECTRONS** are the electrons in the outer shell, which are the only really **IMPORTANT ELECTRONS IN REACTIONS**.



YOU KNOW THE RULE OF EIGHT (NOBLE GAS) AND YOU CAN EXPLAIN WHY SOME ATOMS FORM MOLECULES TO FULFILL THE RULE OF EIGHT (NOBLE GAS)

The **RULE OF EIGHT** states, every atom wants to have its outer shell filled completely – which is in most cases eight electrons.

YOU KNOW WHAT A COVALENT BOND IS AND CAN EXPLAIN HOW A COVALENT BOND IS FORMED BETWEEN TWO ATOMS

DEFINITION: A COVALENT BOND IS A FORM OF CHEMICAL BONDING THAT IS CHARACTERIZED BY THE SHARING OF PAIRS OF ELECTRONS BETWEEN ATOMS.

YOU ARE ABLE TO DRAW THE LEWIS FORMULA FOR ANY SIMPLE MOLECULE

DEFINITION: LEWIS STRUCTURES ARE DIAGRAMS THAT SHOW THE BONDING BETWEEN ATOMS OF A MOLECULE AND THE LONE PAIRS OF ELECTRONS THAT MAY EXIST IN THE MOLECULE.

YOU CAN DISTINGUISH BETWEEN A BONDING PAIR OF ELECTRONS AND A LONE PAIR OF ELECTRONS

DEFINITION: A LONE PAIR IS A VALENCE ELECTRON PAIR WITHOUT BONDING OR SHARING WITH OTHER ATOMS.

A bonding pair is involved in bonding or sharing.

YOU CAN SHOW WHAT A DATIVE BOND IS AND ARE THEREFORE ABLE TO DRAW MORE COMPLEX MOLECULES

One partner gives to electrons and the other one none.

YOU ARE ABLE TO DESCRIBE THE THREE DIMENSIONAL SHAPE OF ANY MOLECULE

There are several different forms

- Linear
 $AB_2 \rightarrow BeCl_2$
- Planar-trigonal
 $AB_3 \rightarrow BF_3$
- Tetraedrisch
 $AB_4 \rightarrow CH_4$
- Trigonal-bipyramidal
 $AB_5 \rightarrow PF_5$
- Oktaedrisch
 $AB_6 \rightarrow SF_6$

SOURCES

Definitions by Wikipedia