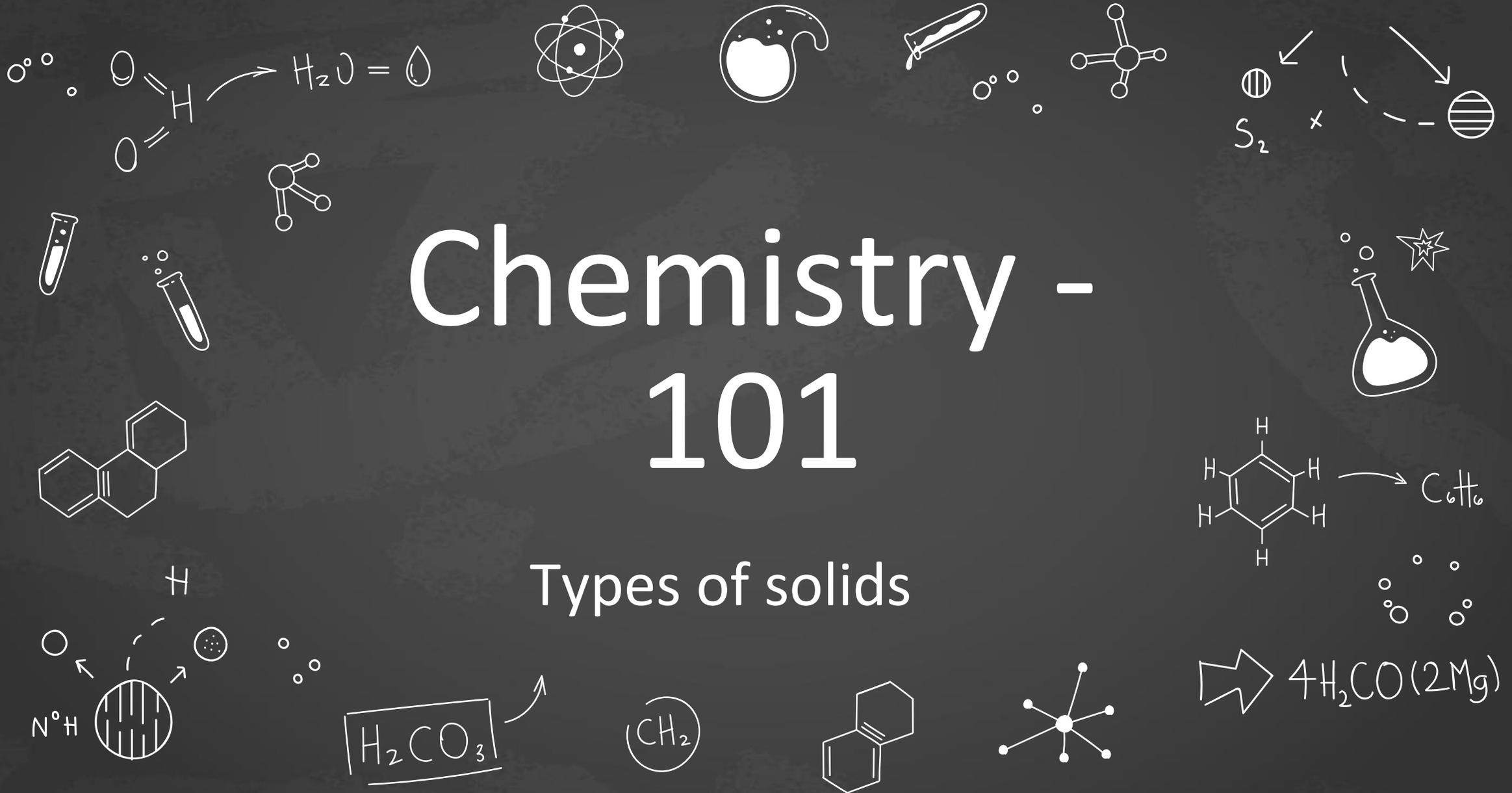


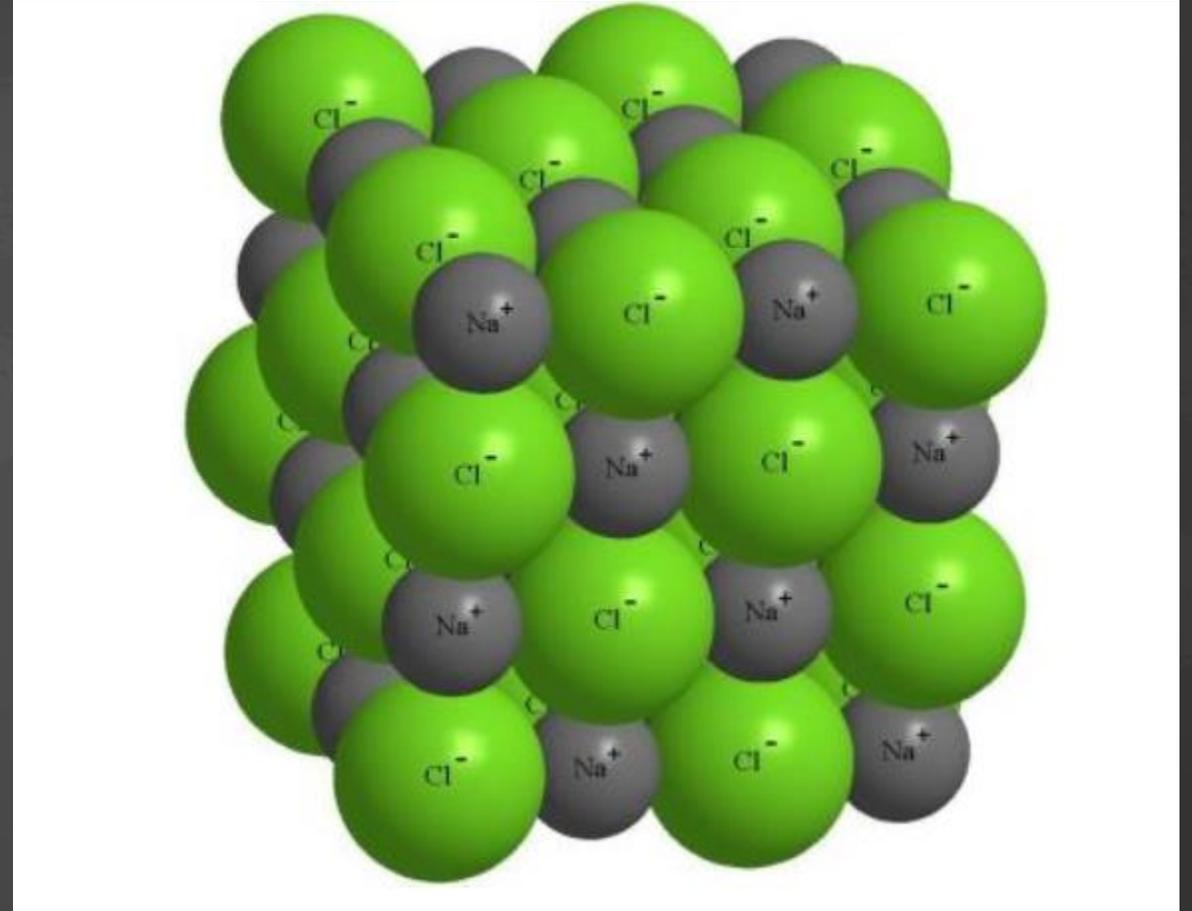
Chemistry - 101

Types of solids



Ionic solids

Atoms are neutral (the same number of protons and neutrons);
When atoms lose or gain electrons in order to achieve “a noble structure” and stability the particles become charged;
The charged particles are called:
And they form ... bonds;
These are strong *intrabonds*, caused by the attraction between differently charged ...
They are usually formed between metals and nonmetals.



NaCl structure

The ionic bond (the attractive force between the ions is governed by Coulomb's law and is directly proportional to the charges on the ions and inversely proportional to the square of the distance between the ions.

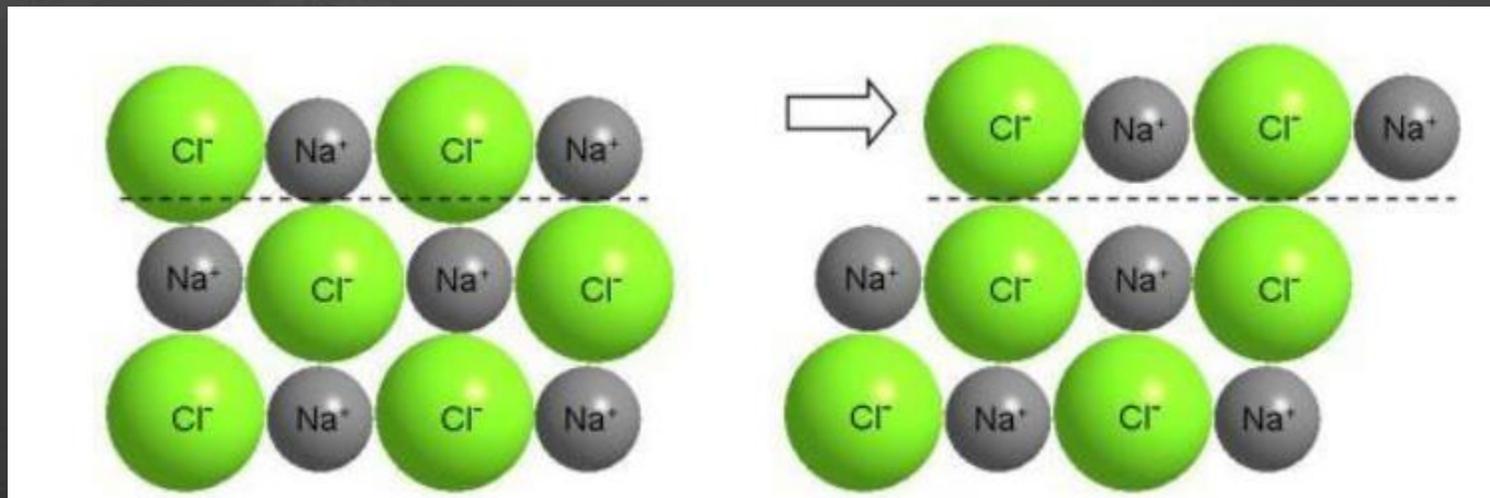
$$F \sim q_1q_2/r^2$$

Which ionic solids will have higher melting point (greater attraction?)

Made of higher or smaller charges?

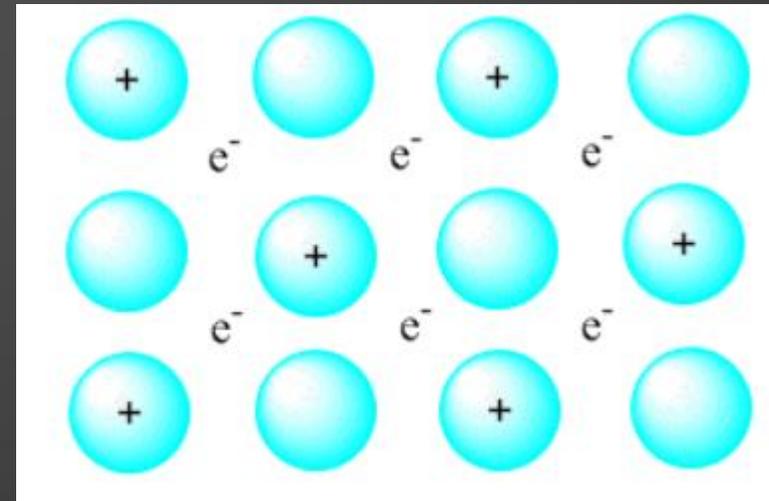
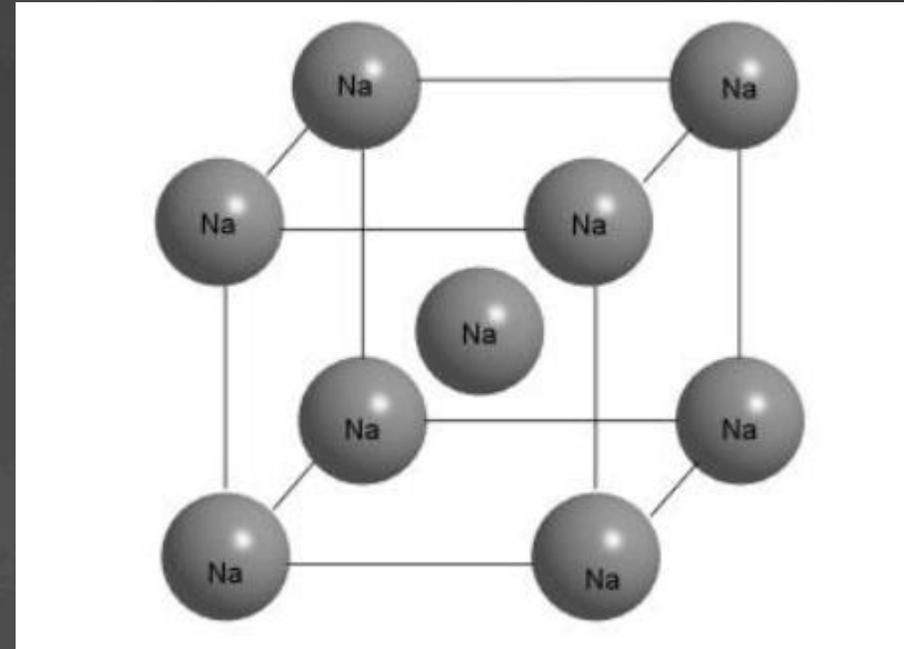
Made of bigger or smaller ions?

The more charge dense the ions, the greater the attraction.



Metals

A metal's bonding and structure can be considered to be a close-packed lattice of positive kernels, surrounded by a "sea" of free-moving electrons. Metallic bonds are formed by elements with a few valence electrons.



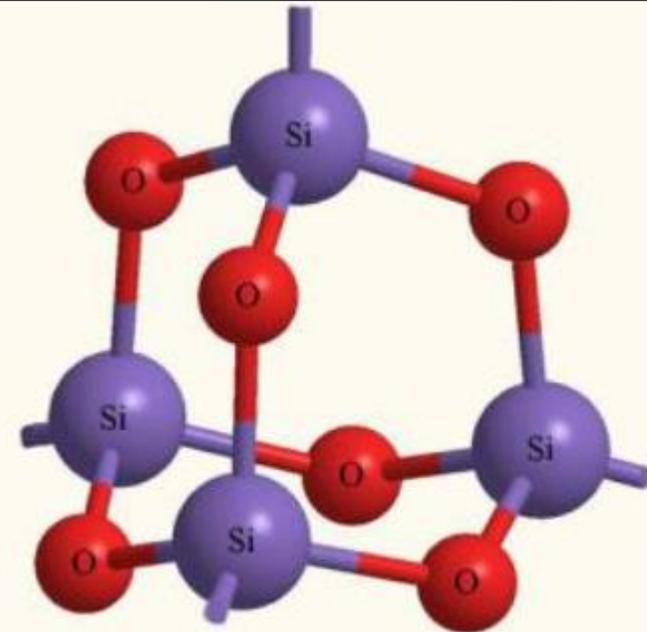
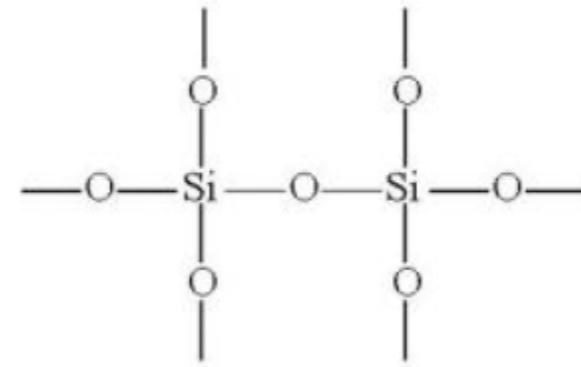


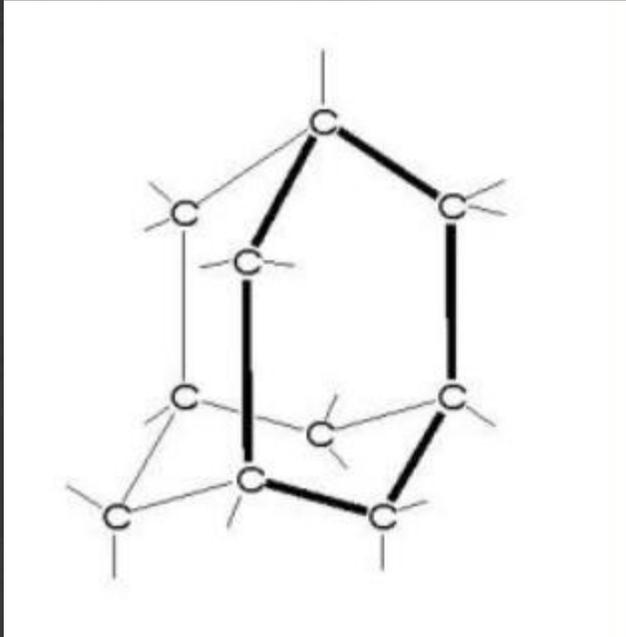
**Приготовление
жидкого сплава
натрия и калия**

Covalent network solids

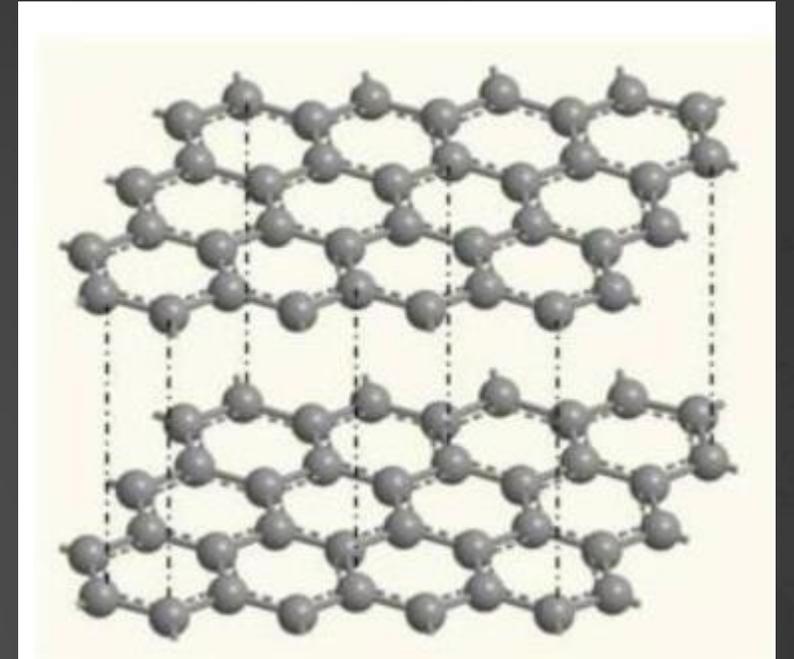
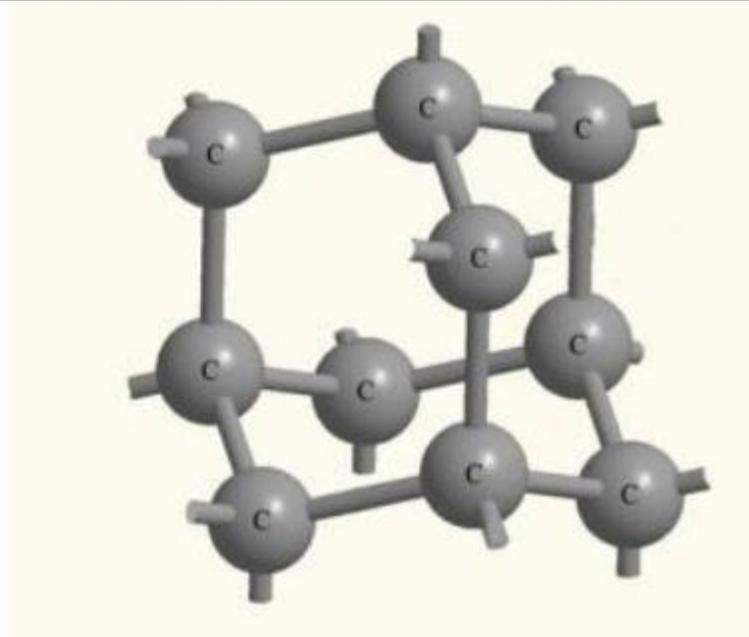
These are structures where non-metal atoms are bonded to one another with strong covalent bonds in a massive (or giant) two- or three-dimensional continuous network.

Melting points are high and the solids are hard because of the bond strength.





Diamond



Graphite

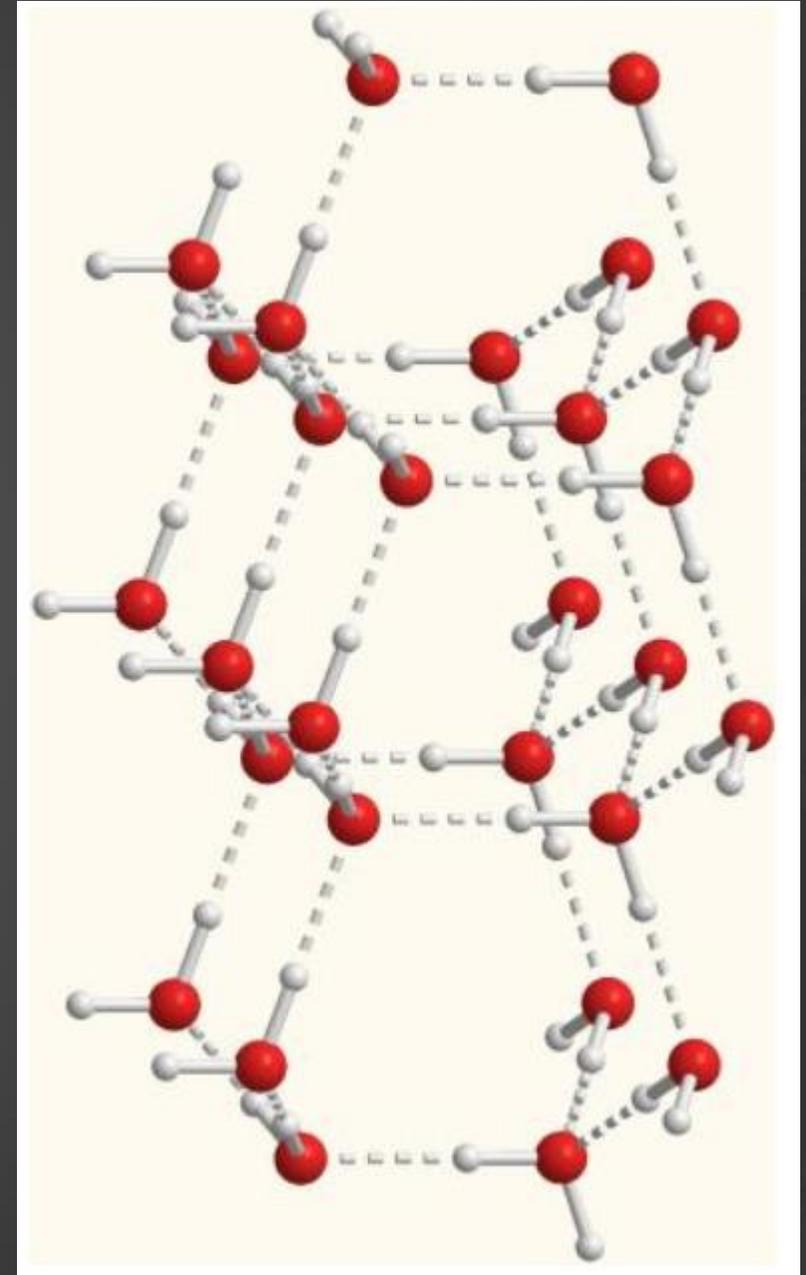


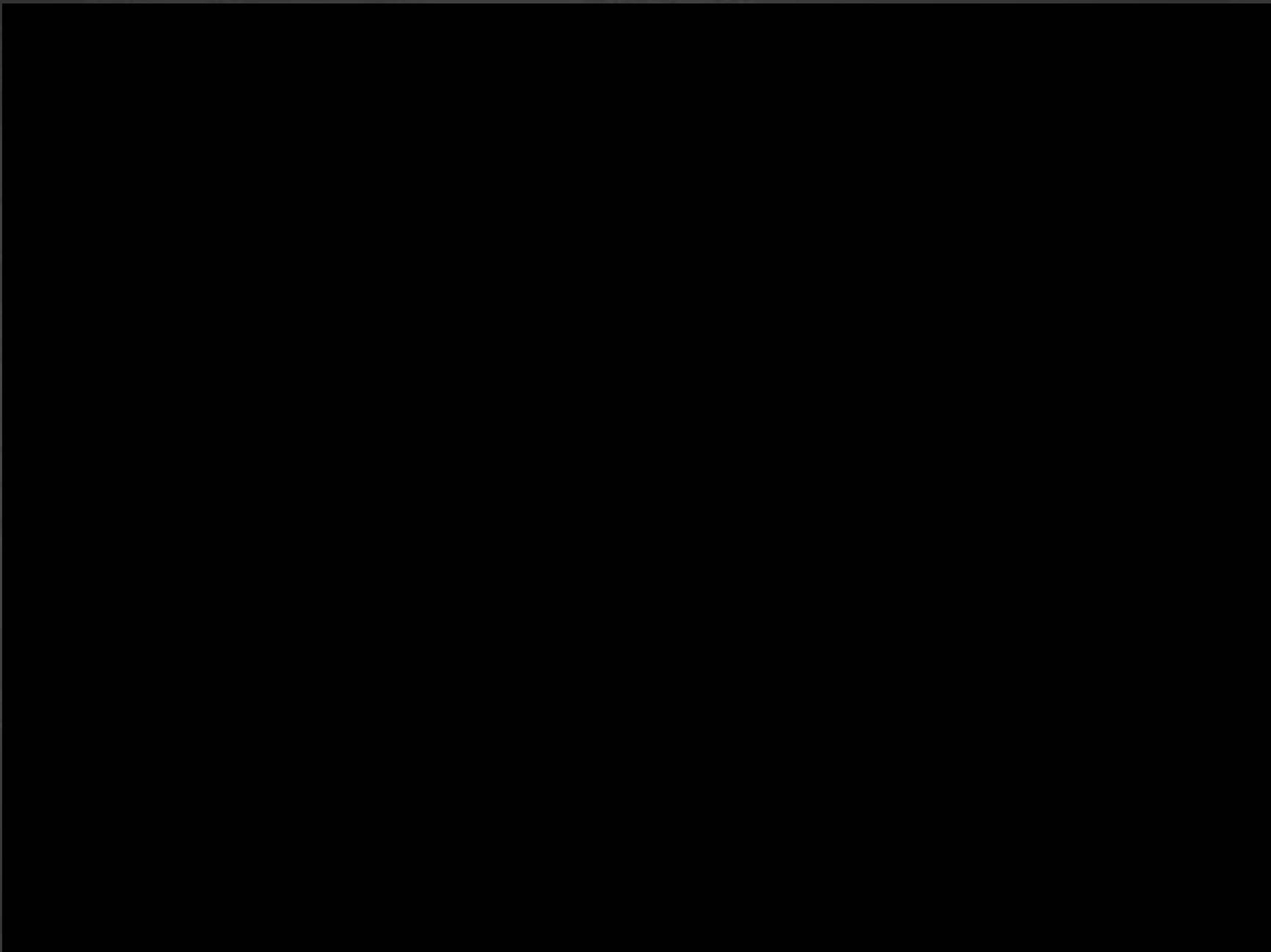
Molecular solids

Discrete molecules, made from non-metals, are attracted to each other with relatively weak intermolecular forces.

Molecular solids tend to have relatively low melting points and sometimes form soft solids (e.g., iodine) .

No ions and no free-moving electrons are present, so molecular solids are expected to be non-conductors.





This class uses the materials from the following books:

Larry Gonick and Graig Criddle “The cartoon guide to chemistry”

Manyuilov and Rodionov “Chemistry for children and adults”

Kuzmenko, Eremin, Popkov “Beginnings of chemistry”