

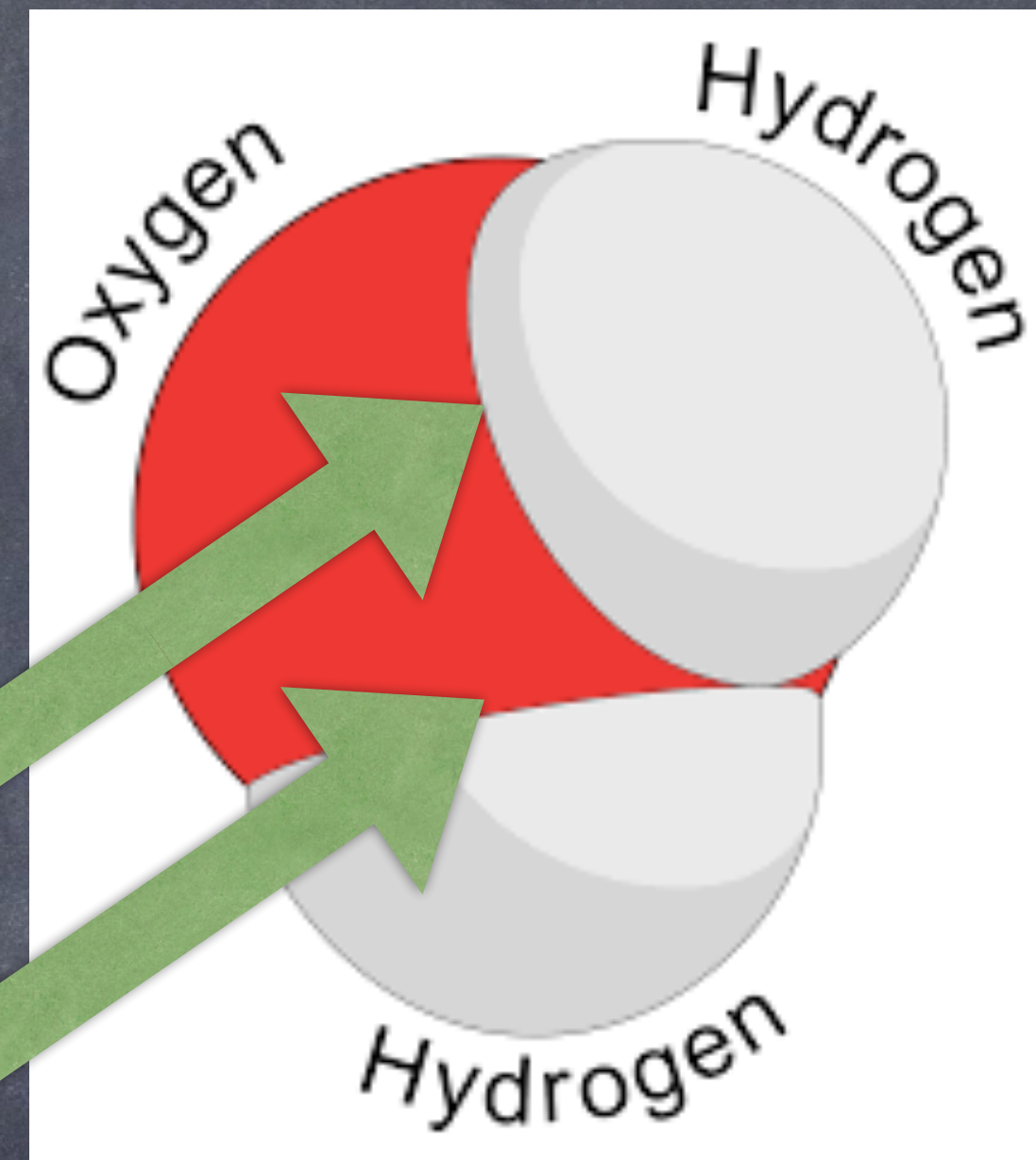
Simple Vs. Extended Structures

The structure of matter

Properties of Simple Structures

Simple structures are WEAK and have trouble staying together because they have FEW many bonds.

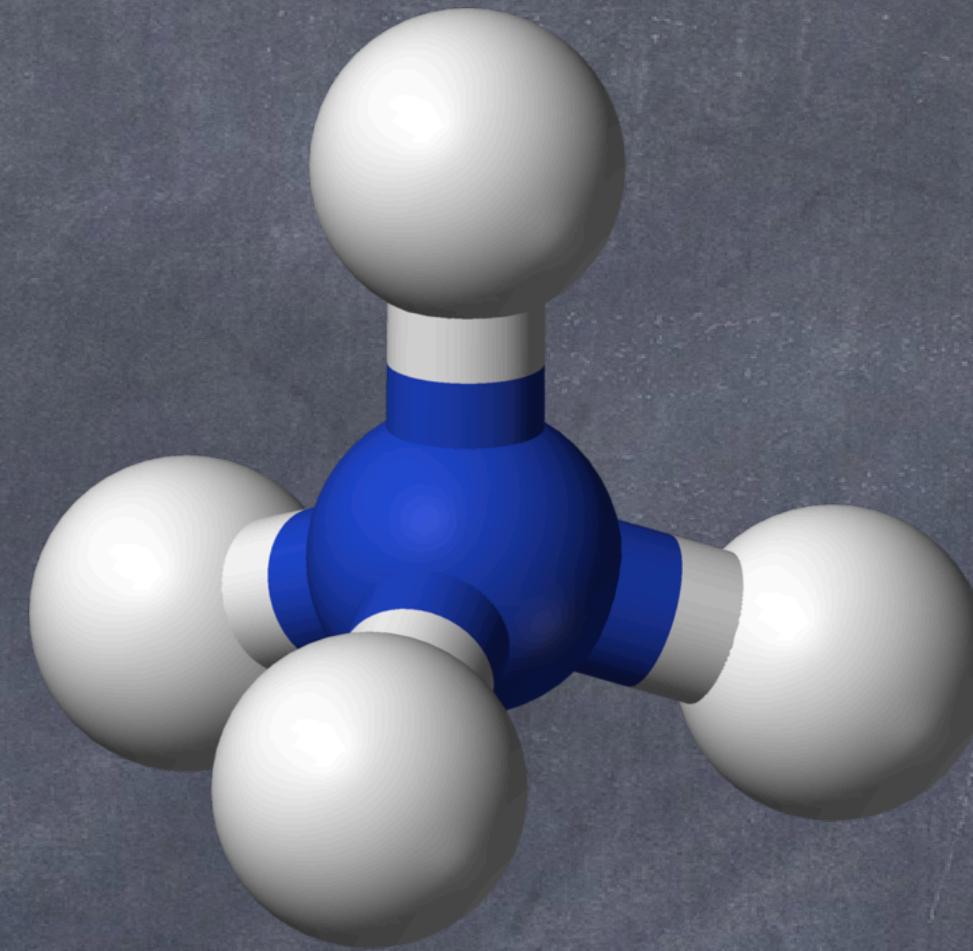
For example: The water molecule only has 2 bonds. (Everywhere they touch is a bond.)



Properties of Simple Structures

Simple molecules are generally found naturally as mostly GASES and LIQUIDS.

Example:



Ammonia NH_3

This molecule has 3 Hydrogen Atoms bonded to 1 Nitrogen atom. This means it only has 4 bonds.

Example:

Properties of Simple Structures

Simple molecules have LOW MELTING and BOILING POINTS.



Melting Point - the temperature at which a given solid will melt.

Boiling Point - the temperature at which a liquid boils and turns to vapor.

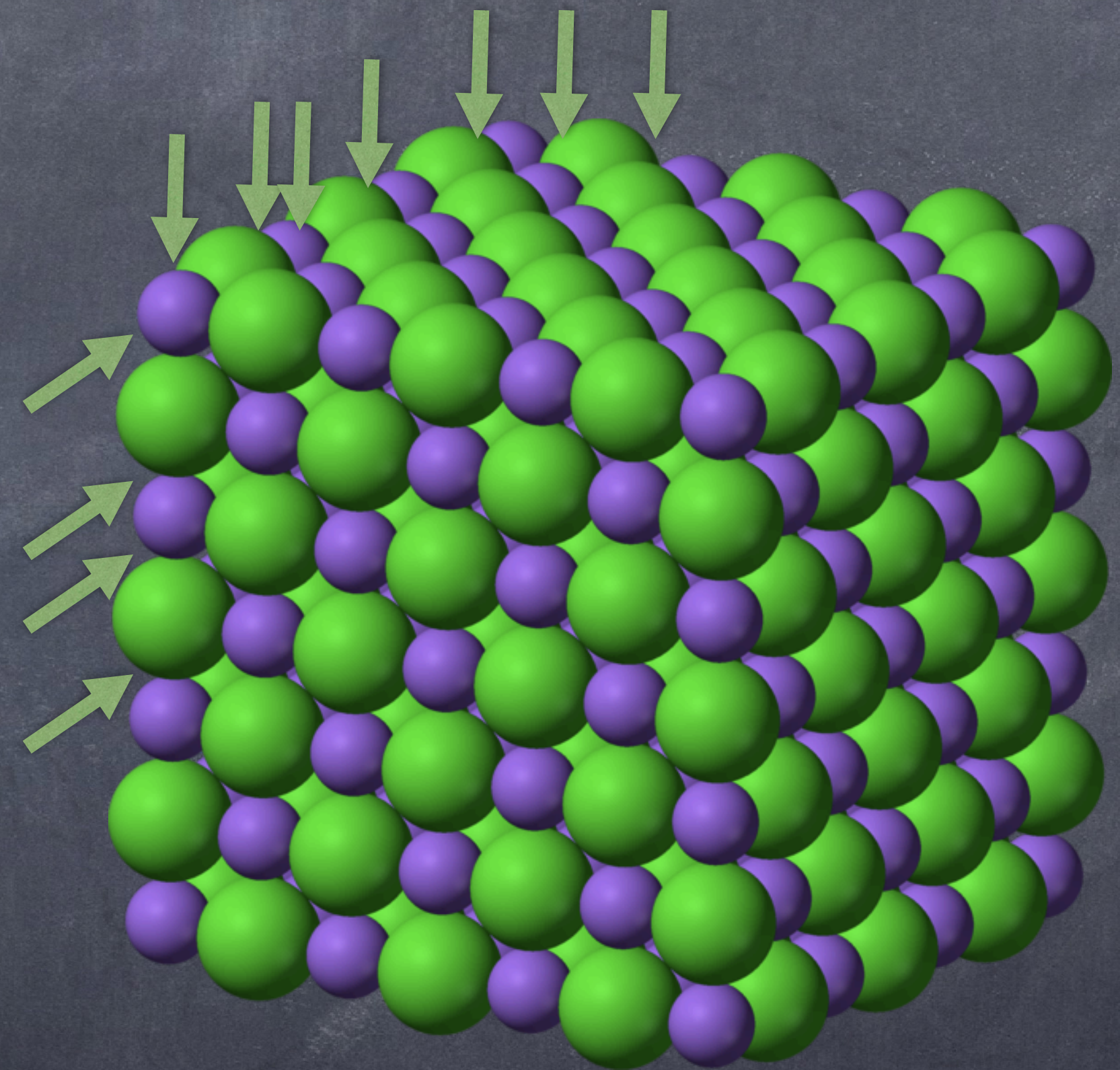
| Substance | Melting Point | Boiling Point |
|-----------|------------------|------------------|
| Water | 32 degrees F | 212 degrees F |
| Ammonia | -107.9 degrees F | -28.01 degrees F |

Properties of Extended Structures

Extended structures are **STRONG**
because they have **MANY** bonds.

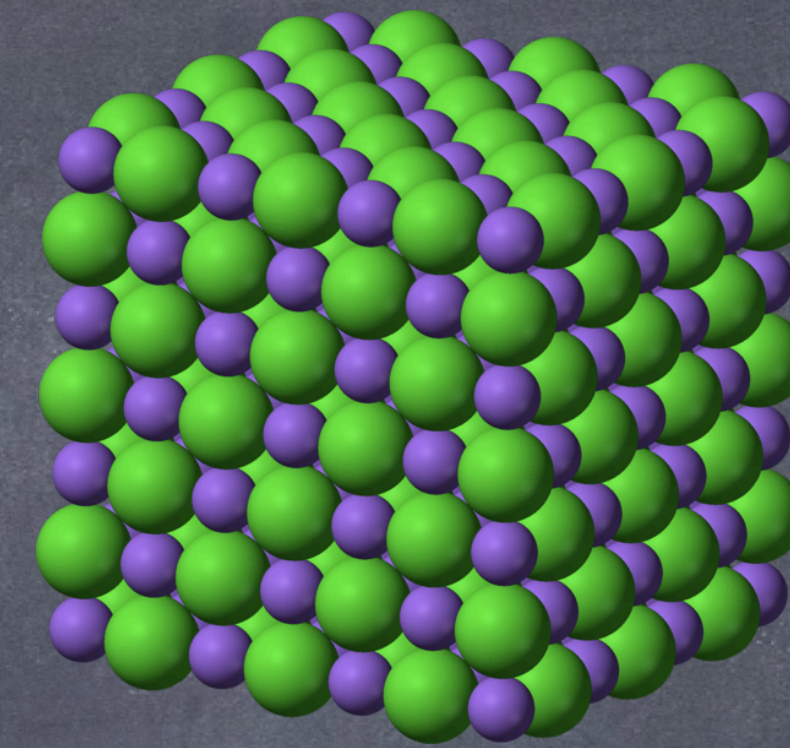
For example: On the right is a
model of a salt molecule shows it
has many bonds!

(Everywhere they touch is a bond.)



Not all bonds are
labeled, but you can see
there are a lot!

Properties of Extended Structures



Extended structures use A LOT of atoms.

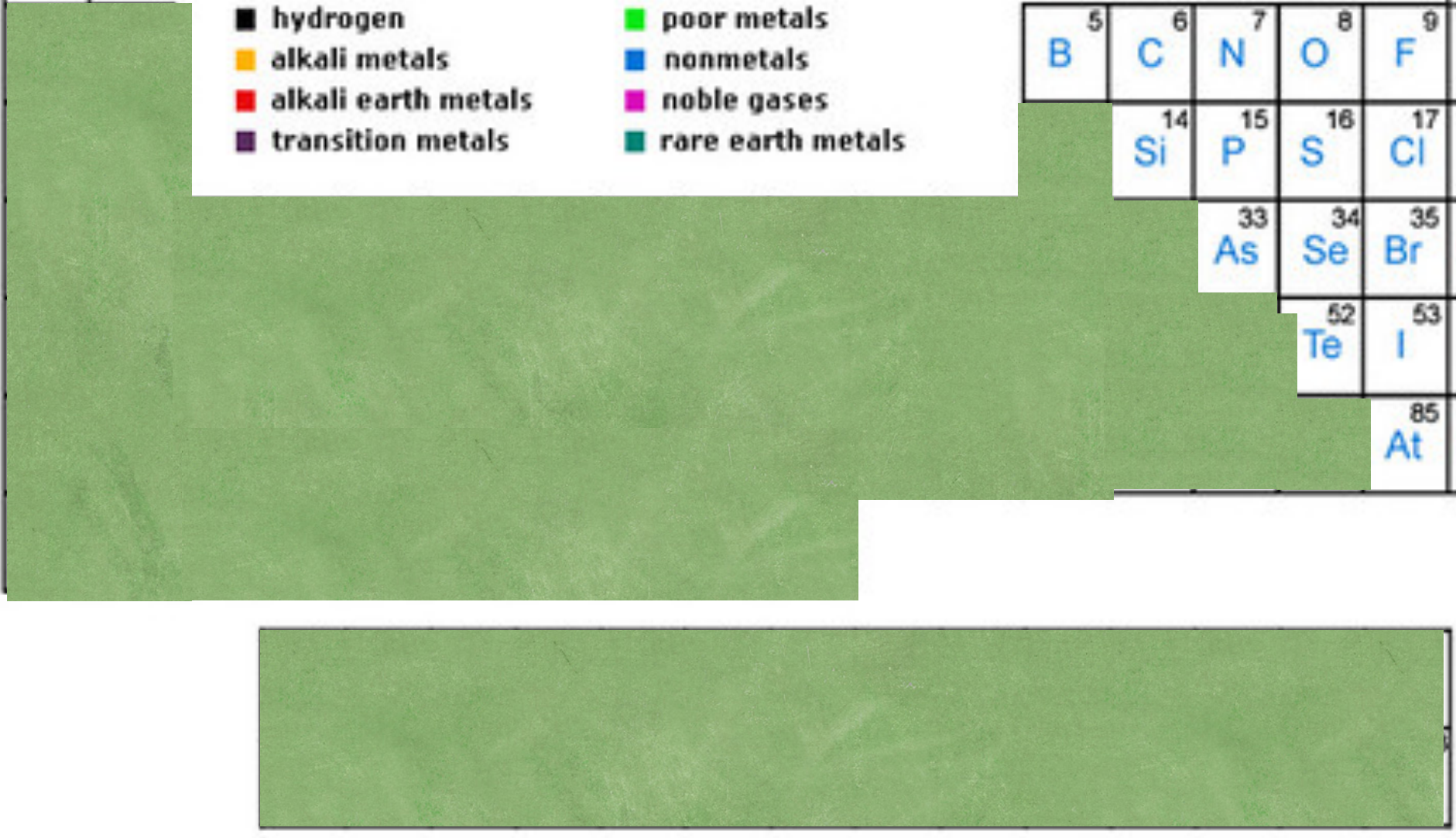
The atoms that make up extended molecules are NON-METALLIC.

For example: On the right is a model of a salt molecule. The green ball represents Na or Sodium. The purple ball represents Cl or Chlorine. Together they make Sodium Chloride or NaCl.

Periodic Table of the Elements

| | | | | | | | | | | | |
|----------------|--|--|--|--|------------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| H ¹ | | | | | | | | | He ² | | |
| | | | | | B ⁵ | C ⁶ | N ⁷ | O ⁸ | F ⁹ | Ne ¹⁰ | |
| | | | | | Si ¹⁴ | P ¹⁵ | S ¹⁶ | Cl ¹⁷ | Ar ¹⁸ | | |
| | | | | | | | As ³³ | Se ³⁴ | Br ³⁵ | Kr ³⁶ | |
| | | | | | | | | | Te ⁵² | I ⁵³ | Xe ⁵⁴ |
| | | | | | | | | | At ⁸⁵ | Rn ⁸⁶ | |

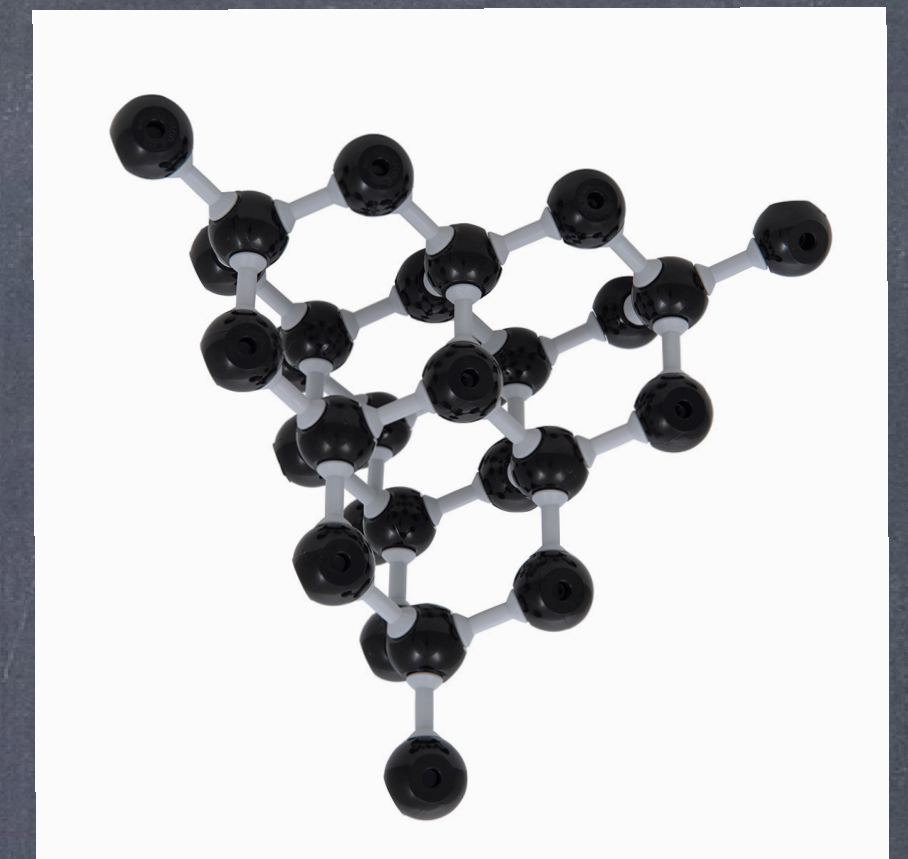
- hydrogen
- alkali metals
- alkali earth metals
- transition metals
- poor metals
- nonmetals
- noble gases
- rare earth metals



Properties of Extended Structures

Extended structures
are found naturally
as solids.

Example: In this form, carbon
has formed into a diamond.



Carbon - C

Although this structure is made
only of Carbon, it has many
bonds.

Example:

Properties of Extended Structures

Extended structures have HIGH MELTING and BOILING POINTS.



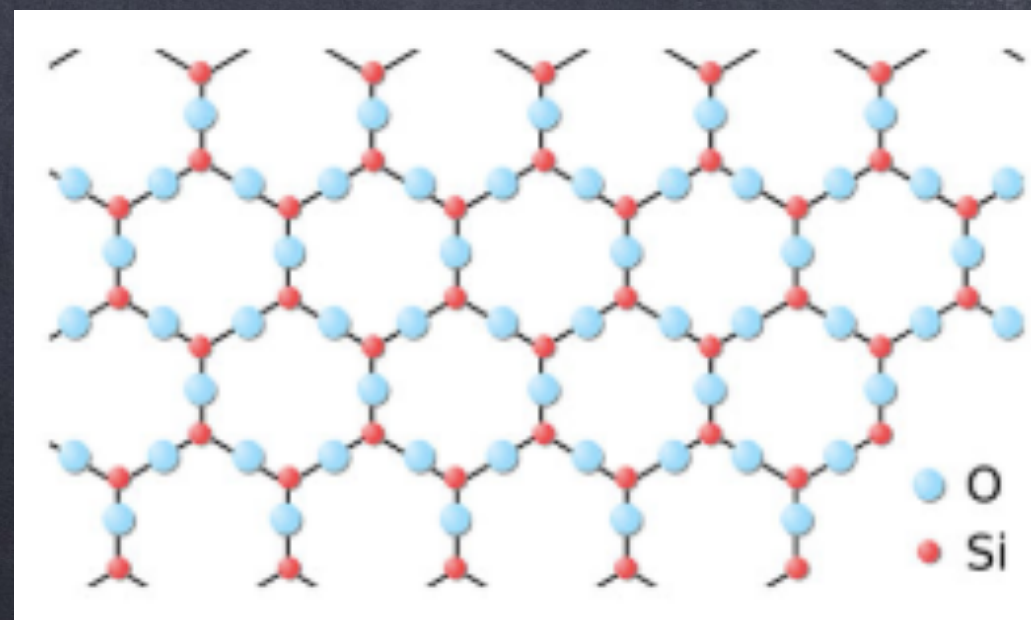
Melting Point - the temperature at which a given solid will melt.

Boiling Point - the temperature at which a liquid boils and turns to vapor.

| Substance | Melting Point | Boiling Point |
|-------------------|-----------------|-----------------|
| Diamond (Carbon) | 6,422 degrees F | 8,726 degrees F |
| Table Salt (NaCl) | 1,474 degrees F | 2,669 degrees F |

Properties of Extended Structures

Extended structures are formed from atoms that arrange themselves in a pattern.



Example:

DNA is an extended structure that continues to build in a pattern.



Quartz is another example of an extended structure with molecules that bond to each other in a pattern.