



Classifying Compounds Summary

Inorganic Compounds

Physical Properties:
Highest m.p., highest b.p., usually solid at STP
Dissolves easily in water

Structure:
Mostly ionic particles
and ionic bonds

Composition:
Most metals &
Non-metals

Chemical Properties:
Hard to burn

Organic Compounds

Composition:
Made mostly of
CARBON & HYDROGEN
with some other
non-metals
(mostly O, N, S, P)

Physical Properties:
Lower m.p., lower b.p.,
Not usually soluble in water

Structure:
Mostly molecular structure,
covalent bonds,
forms many kinds of isomers

Chemical Properties:
Burns easily

Hydrocarbons

Composition:
CARBON & HYDROGEN

Saturated (Alkanes)

Chemical Properties:
Burning releases
the most heat

Physical Properties:
Feels greasy, not soluble in
water, less dense than water
lowest bp, mp of
organics with similar
mass

Unsaturated (Alkenes & Alkynes)

Structure:
carbon-carbon
multiple bonds;
alkenes form cis-trans
stereoisomers

Chemical Properties:
Burns Hotter;
Addition Reactions
with Hydrogen, Halides,
Water, and KMnO_4

Alcohols

Structure:
Hydroxyl group (-OH)
forms 1°, 2° and 3°
centers

Physical Properties:
Higher m.p., higher b.p.,
Soluble in water with up
to 4 carbons.

Chemical Properties:
Elimination to form Alkenes;
Oxidation to form
Ketones or Aldehydes

Thiols

Structure:
Thiol group (-SH)

Physical Properties:
Tastes bitter; smells foul

Chemical Properties:
Oxidizes to form
Disulfides

Phenols

Structure:
Hydroxyl group (-OH)
on aromatic ring

Physical Properties:
Tastes malty; many
food spices are phenols
pleasant smells

Ethers

Structure:
Ether group (-O-)
between two alkyl groups

Physical Properties:
lower m.p., lower b.p.,
good solvent for many
organic molecules

Carboxylic Acids

Structure:
Carboxyl Group (-CO₂H)
Can hydrogen bond
with each other, very
solubility in water

Chemical Properties:
can be reduced
to form Aldehydes;
condensed to form esters

Physical Properties:
many taste tart, sour,
tangy or zesty,
low pH, high solubility,
higher bp, mp than
alcohols

Aldehydes

Structure:
Carbonyl group (-CHO)
with at least one hydrogen
attached

Physical Properties:
Polar molecule but no hydrogen
bonding with itself,
Intermediate m.p. and b.p.
between alcohols & hydrocarbons
of similar masses

Chemical Properties:
Can be reduced to form a 1° Alcohol;
can be oxidized to form
carboxylic acids

Ketones

Structure:
Carbonyl group (-CO-)
between two alkyl groups

Chemical Properties:
Can be reduced
to form a 2° Alcohol

Physical Properties:
Polar molecule but no hydrogen
bonding with itself,
Intermediate m.p. and b.p.
between alcohols & hydrocarbons
of similar masses;
many have a
metallic taste

And many more
families including...

Esters, Amines, Amides...