

## Origin of organic compounds

- Naturally occurring organic compounds are found in plants, animals, and fossil fuels
- · All of these have a plant origin
- All of these rely on the "fixing" of C from CO2
- Synthetic organic compounds are derived from fossil fuels or plant material



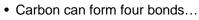




#### Introduction

- · Most current research focuses on Organic
- · Originally from "organic" meaning life
- Not just chemistry of life, chemistry of carbon
- Exceptions:
  - -oxides of carbon (CO<sub>2</sub>, CO)
  - -carbonates, bicarbonates (NaHCO<sub>3</sub>, CaCO<sub>3</sub>)
  - -cyanides (NaCN, etc)

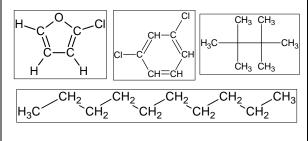
One C with no H, or with metal





#### Carbon forms four bonds

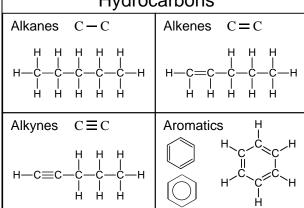
- Carbon can form four bonds, and forms strong covalent bonds with other elements
- This can be represented in many ways ...



## **Functional groups**

- Functional groups are parts of molecules that result in characteristic features
- About 100 functional groups exist, we will focus on about 10
- Useful to group the infinite number of possible organic compounds
- E.g. the simplest group is hydrocarbons
- · Made up of only C and H
- Not really a functional "group"
- Further divided into:
  - Alkanes, Alkenes, Alkynes, Aromatics

# Hydrocarbons



## Functional groups

- Read 1012 1014
- You will need to memorize family name and associated general structure (use study notes: includes ether group)
  H<sub>2</sub>N.
- Handout Molecular model kits
- · Build this structure:



- Assignment: in groups build each of the "Examples" in table 24.1
- Each member must have the exact same molecule (thus you must agree on structure)
- Show me the structure(s) after building each

# Hydroxyl, carbonyl, carboxyl

- There are other names that describe patterns of atoms that are parts of functional groups.
- "Hydroxyl" refers to -OH
- "Carbonyl" refers to C=O
- "Carboxyl" refers to COOH
- Q: which functional groups contain a hydroxyl group? A carbonyl group? A carboxyl group?

Note that properties such as boiling and melting point change due to functional groups