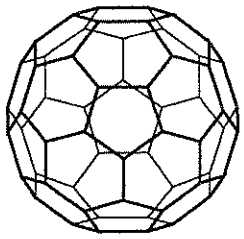
# Introduction to Organic Chemistry

Definition of Organic Chemistry:

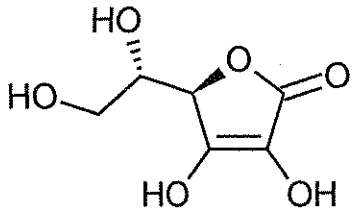
- The study of compounds containing carbon and their properties
- The study of compounds with a carbon backbone

Properties of Organic Compounds

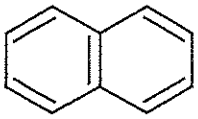
- Bonding is covalent
- Melting and boiling points are lower than inorganic compounds (mostly)
- Do not conduct electricity
- Burn easily (combustion reaction: Organic Compound ($C_XH_X$) + Oxygen ($O_2$) $\rightarrow$ Carbon Dioxide ($CO_2$) and Water ($H_2O$)
- More complex than inorganic compounds (NaCl versus $CH_3CH_2CH_2CH_3$)
- There are millions of different organic molecules



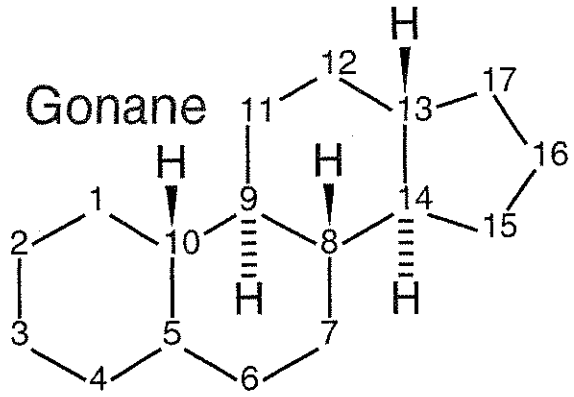
[5,6]fullerene-$C_{60}$-$I_h$




Vitamin C
l-Ascorbic Acid

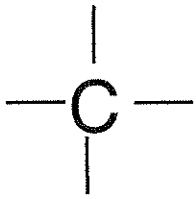


Naphthalene

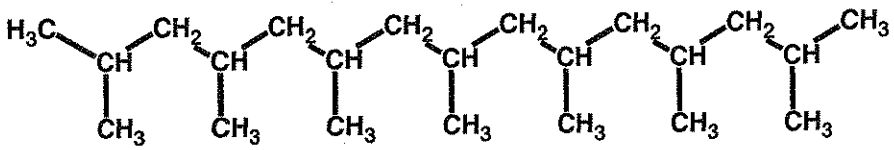


# Carbon

- Carbon is the most abundant element in the periodic table
- Clothing, fuel, food, medicine, plastic, etc. are all made from carbon
- Carbon has unique bonding properties



  - Form covalent bonds
  - Can bond to four other groups
  - Can bond to other carbon atoms repeatedly, this leads to the formation of:
    - Long carbon chains – polymers
    - Ring structures
  - Carbon can bond with every other element (mostly)
  - Carbon-carbon bond is very strong, therefore, it is hard to break




Polypropene (also called Polypropylene) – yogurt containers, ketchup bottles, medicine bottles....

# Plastics

- Plastics are polymers (large organic molecules – carbon chains)
- Plastics are all around us
- They are often made from fossil fuels
- Part of our 'Throw-away' society

| Benefits | Problems |
| --- | --- |
| | |
| Alternatives to Plastics | |