

# Organic Chemistry

## What is Organic Chemistry?

- Organic chemistry is the study of compounds of carbon

## History

- At one time chemists thought that chemical compounds in living organisms were fundamentally different from those that occur in nonliving things
- The belief was that the chemicals from living organisms had a special “vitalism” or “breath of life” in them
- The chemical compounds associated with living organisms were named organic to emphasize their connection with life

### 1828 - Friedrich Wöhler (1800-1882)

- Proved that the theory of vitalism was untrue
- He found a very simple way to convert chemical compounds from living organisms into comparable compounds from nonliving entities
- The definition of organic chemistry was changed as a result of Wöhler’s research

## A New Definition

- Every compound discovered in living organisms had one property in common:
  - they all contained the element carbon
- Thus, the modern definition of organic chemistry—as the study of carbon compounds—was adopted.

## Hydrocarbons

- Hydrocarbons are chemical compounds consisting entirely of carbon and hydrogen
- Hydrocarbons range from methane (one carbon atom) to polymers such as polystyrene, which consists of thousands of carbon and hydrogen atoms
- Hydrocarbons come in a variety of forms: gases (methane), liquids (hexane), waxes (paraffin wax), polymers (polyethylene and polystyrene)

- The primary source of hydrocarbons (on Earth) is fossil fuels
  - coal, oil, and natural gas
- Hydrocarbons can also be produced synthetically
  - start with a petrochemical product and add to it (creating a longer chain hydrocarbon)

## Bonding Characteristics of Carbon

- 4 valence electrons
- Prefers to share electrons
- Up to four bonds can be formed