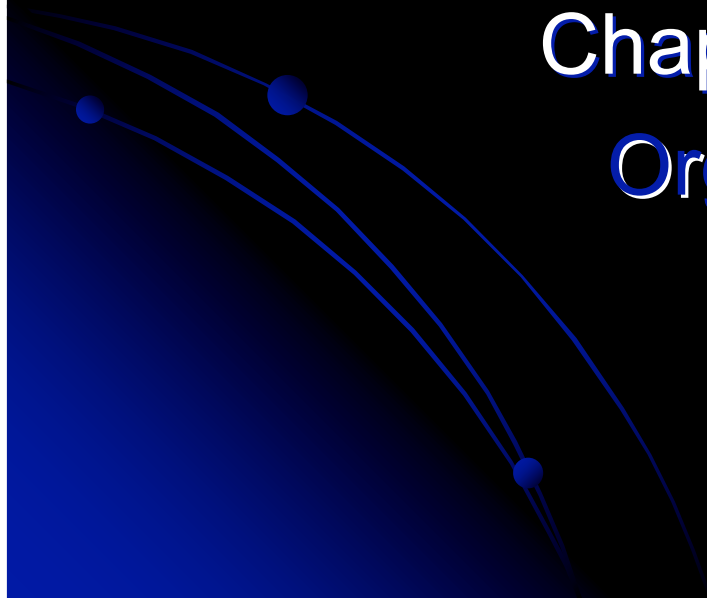


# Forensic Science

## Chapter 5 Introduction Organic Chemistry



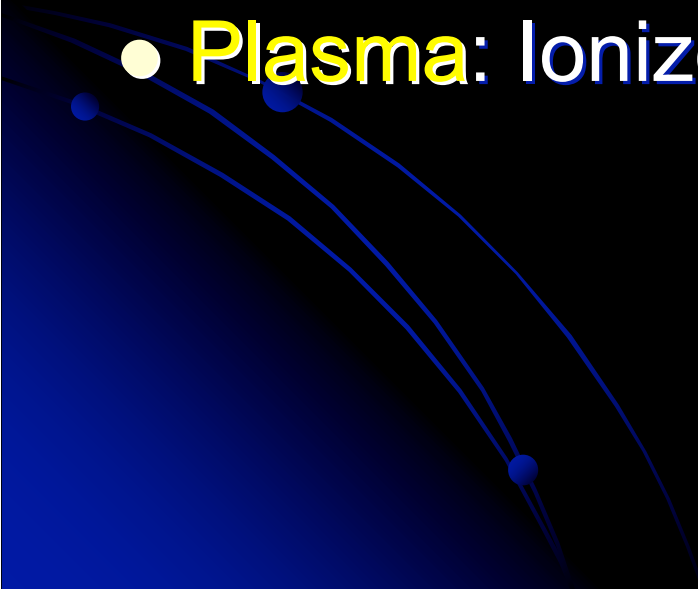
# Elements and Compounds

- **Matter** is anything that has mass and occupies space.
- An **Element** is the simplest substance known and provides the building blocks from which all matter is composed!
- At present, 109 elements have been identified, of these 89 occur naturally on earth and the remainder have been created in the laboratory.
- These elements are arranged in the famous "**Periodic Table of Elements.**"

# From Atoms to Elements to Compounds.

- The smallest particle of an element that can exist and still retain its identity as that element is the **ATOM!**
- Compound is defined as a pure substance composed of two or more elements.
  - Subatomic Particles – Atoms – Elements – Compounds – Macromolecules – Cells – Tissues – Organs – Organ Systems – Organism!  
(**Physics, Chemistry and Biology**)

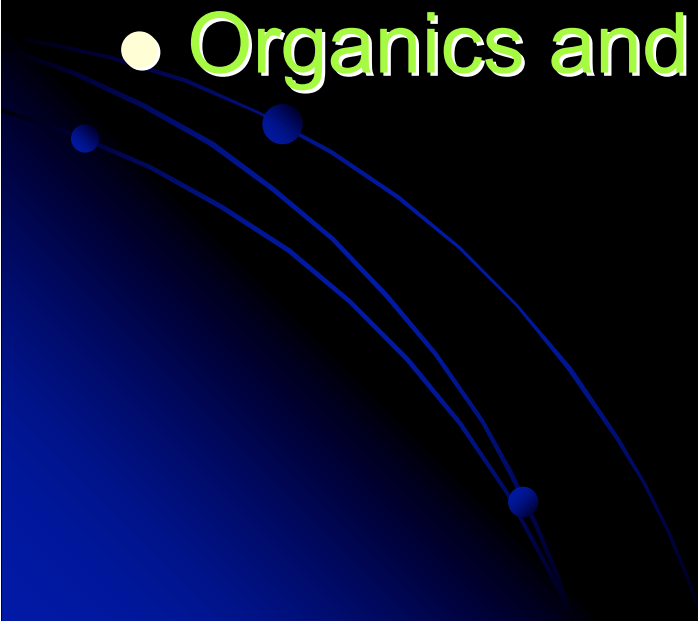
# Physical States

- The 4 States of Matter!
  - **Solid**: Both Shape and Volume.
  - **Liquid**: Volume but no Shape!
  - **Gas**: No definite Volume or Shape.
  - **Plasma**: Ionized Charged Particles!
- 

# Increases in Kinetic Energy

- Solid – Liquid – Gas – Plasma.
- **Sublimation** is defined as a physical change from the solid directly into the gaseous state.
- So What does this have to do with Forensics?
- Well...
- From a chemistry perspective. Not all attempts at mixing substances is productive.
- For Example: Oil and Water.
- When ever a situation exists in which a substance can be distinguished by a visible boundary, different phases exist!

# Selecting An Analytical Technique.

- The proper selection of analytical techniques will allow the Forensic Scientist to identify or compare matter.
  - These Analytical Groups are...
  - **Organics and In organics**
- 

# Organics and Inorganics

- They contain the element **Carbon**, usually combined with at least one of the following elements:
- Hydrogen
- Oxygen
- Nitrogen
- Sulfur
- Phosphorous
- Chlorine
- Bromine
- Just to name a few 😊
- All other chemical substances fall into the Inorganic category.

# Other reasons for selecting an analytical technique.

- **Qualitative or Quantitative determinations.**
- Qualitative relates just to the identification of materials under study.
- Quantitative relates to the percent composition of the components of a mixture.
- For Example
- A qualitative identification of a powder may reveal the presence of Heroin and Quinine, whereas quantitative may conclude the presence of 10% Heroin and 90% Quinine.
- Forensics ----> **Quantitative then Qualitative.**



# Evaluation of Evidence @ the Crime Lab.

- Most evidence received at the crime lab required identification of its organic components.
- These compounds may include the following commonly abused drugs.

Alcohol

Marijuana

Heroin

Amphetamines

Barbiturates

Synthetic Fibers

Petroleum Products

Paint

High Order Explosives

# Testing Tools

- The study of the absorption of light by chemical substances is known as **Spectrophotometry**.
- This serves as a basic tool for the identification and characterization of **Organic Materials**.
- However its optimum use requires that the materials be relatively pure.
- This almost never happens☹.
- So, Forensic Scientist use the analytical technique known as Chromatography.
- **Chromatography** is a means of separating and tentatively identifying the components of a mixture.

# Thank you for your attention😊

- Tomorrow
- Lecture Topic: Chromatography.
- Experiments on Wednesday and Thursday.
- Thanks for shopping...do come again.
- ***Try the veal and remember to tip your waitress on the way out!***