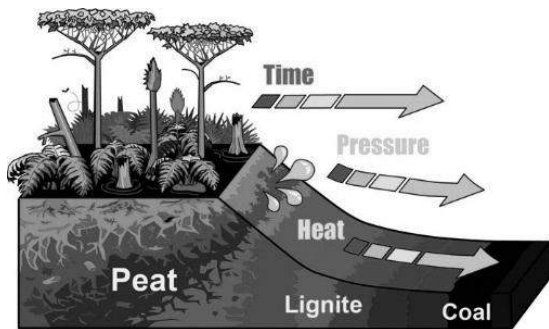


# Coal and Petroleum

## Coal

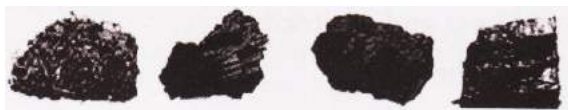
Coal is a combustible sedimentary rock. It is a fossil fuel. It is composed primarily of carbon and hydrogen along with small quantities of other elements, notably sulphur. It is a nonrenewable resource.

## Coal Formation



Coal is a sedimentary rock formed from plants that flourished millions of years (about 300 million) ago when tropical swamps covered large areas of the world. Lush vegetation, such as early club mosses, horsetails, and enormous ferns, thrived in these swamps. Generations of this vegetation died and settled to the swamp bottom and over time the organic material lost oxygen and hydrogen, leaving the material with a high percentage of carbon. Layers of mud and sand accumulated over the decomposed plant matter, compressing and hardening the organic material as the sediments deepened. Over millions of years, deepening sediment layers, known as overburden, exerted tremendous heat and pressure on the underlying plant matter, which eventually became coal.

## Types of Coal



Peat      Lignite      Bituminous      Anthracite

As geological processes apply pressure to dead biotic matter over time, under suitable conditions it is transformed successively into:

**Peat:** It is considered to be a precursor of coal, has industrial importance as a fuel in some regions, for example, Ireland and Finland.

**Lignite:** It is also referred as brown coal, is the lowest rank of coal and used almost exclusively as fuel for electric power generation.

**Bituminous:** It is dense rock which is usually black but sometimes dark brown, used primarily as fuel in steam-electric power generation, with substantial quantities also used for heat and power applications in manufacturing and to make coke.

**Anthracite:** It is the highest rank of coal; a harder, glossy, black coal used primarily for give some other use.

## Petroleum

It is naturally occurring liquid. It is, also known as crude oil, a fossil fuel, formed over a period of millions of years, from organisms that lived in the sea at that time. Their dead bodies sank to the bottom of sea and were covered with mud and sand. Due to high pressure, heat, in the absence of air, the dead remains of tiny plants and animals were slowly converted into petroleum. The process of separating crude petroleum oil into more useful fractions is called refining. The various useful fractions obtained by the refining of petroleum are: Petroleum gas. Petrol, Kerosene, Diesel, Lubricating oil. Paraffin wax and bitumen.

## Combustion

It is a process of rapid oxidation or burning of a substance in the presence of oxygen to produce heat and light.

Requirements for the occurrence of combustion are:

- ❖ Presence of combustible substance
- ❖ Presence of supporter of combustion (like air or oxygen).
- ❖ Heating the combustible substance to its ignition temperature.

## **Fuel**

Fuel, substance that reacts chemically with another to produce heat or that produces heat by nuclear processes. The term fuel is generally limited to those substances that burn readily in air or oxygen, emitting large quantities of heat.

### **Solid Fuels**

The common solid fuels, in order of heat potential are coal, coke, wood, sugarcane bagasse and peat.

### **Liquid and Gaseous Fuels**

Common liquid fuels are fuel oils, gasoline and naphthas derived from petroleum and to a lesser extent coal tar, alcohol and benzol obtained from coke manufacture.



Gaseous fuels such as natural gas, refinery gas and manufactured gases such as producer gas are usually mixed with air before combustion to supply a maximum amount of oxygen to the fuel.

## **Flame**

Flame is the visible gaseous part of a fire. All the gases which undergo combustion produce flame. The Candle flame consists of three zones that are easily distinguished. The innermost zone is the dark zone which is formed just around the wick of the candle as the candle burns. It is the least hot of all the zones. The middle zone is the zone which is moderately hot with limited oxygen supply. The colour of this zone is yellow and it is a luminous zone. The outermost zone of the flame is blue in colour and is the hottest of all the zones. This is due to complete combustion.