Coal

Introduction

Coal is a sedimentary deposit composed predominantly of carbon that is readily combustible.
Coal is black or brownish-black, and has a composition that (including inherent moisture) consists of more than 50 percent by weight and more than 70 percent by volume of carbonaceous material.
It is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time.

Origin of Coal

At various times in the geologic past, the Earth had dense forests in low-lying wetland areas. Due to natural processes such as flooding, these forests were buried underneath soil.
As more and more soil deposited over them, they were compressed. The temperature also rose as they sank deeper and deeper.
As the process continued the plant matter was protected from biodegradation and oxidation, usually by mud or acidic water. This trapped the carbon in immense peat bogs that were eventually covered and deeply buried by sediments. Under high pressure and high temperature, dead vegetation was slowly converted to coal.

Coal ranks

There are four major types (or "ranks") of coal. Rank refers to steps in a slow, natural process called "coalification," during which buried plant matter changes into an ever denser, drier, more carbon-rich, and harder material. The four ranks are:

- **Anthracite**: The highest rank of coal. It is a hard, brittle, and black lustrous coal, often referred to as hard coal, containing a high percentage of fixed carbon and a low percentage of volatile matter.
- **Bituminous**: Bituminous coal is a middle rank coal between subbituminous and anthracite. Bituminous coal usually has a high heating (Btu) value. Bituminous coal is blocky and appears shiny and smooth in hand specimen, on a closer look one might see it has thin, alternating, shiny and dull layers.
- **Subbituminous**: Subbituminous coal is black in color and is mainly dull (not shiny). Subbituminous coal has low-to-moderate heating values.
- **Lignite**: Lignite coal, aka brown coal, is the lowest grade coal with the least concentration of carbon. Lignite has a low heating value and a high moisture content.

The precursor to coal is peat. Peat is a soft, organic material consisting of partly decayed plant and mineral matter. When peat is placed under high pressure and heat, it undergoes physical and chemical changes (coalification) to become coal.

Uses of Coal

Electricity Generation Power generation is the primary use for coal worldwide. In coal-fired power plants, bituminous coal, subbituminous coal, or lignite is burned. The heat produced by the combustion of the coal is used to convert water into high-pressure steam, which drives a turbine, which produces electricity.
Metal Production: Coal used for steel making needs to be high in carbon content and low in moisture, ash, sulfur, and phosphorous content. Coal that meets these specifications is known as metallurgical coal. Metallurgical (coking) coal is a key ingredient in steelmaking.
Coal also has several other uses, including in cement production, carbon fibers and foams, medicines, tars, synthetic petroleum-based fuels, and home and commercial heating.

Coal resources of India

The Coal resources of India are available in older Gondwana Formations of peninsular India and younger Tertiary formations of north-eastern region.
The Indian coal deposits are primarily concentrated in the Gondwana sediments occurring mainly in the eastern and central parts of Peninsular India, although Gondwana coal deposits also occur in Assam and Sikkim in north eastern part of the country.
The Tertiary coal-bearing sediments are found in Assam, Arunachal Pradesh, Nagaland and Meghalaya.
Indian lignite deposits occur in the Tertiary sediments in the southern and western parts of peninsular shield particularly in Tamil Nadu, Puducherry, Kerala, Gujarat, Rajasthan and Jammu & Kashmir.
Coal is the most important and abundant fossil fuel in India. It is estimated that coal accounts for 55% of the country's energy need.