1. **intensive variable** A quantity in a macroscopic system that has a well defined value at every point inside the system and that remains (nearly) constant when the size of the system is increased. Examples of intensive variables are the pressure, temperature, density, specific heat capacity at constant volume, and viscosity. An intensive variable results when any extensive variable is divided by an arbitrary extensive variable such as the volume. A macroscopic system can be described by one extensive variable and a set of intensive variables.
2. **equilibrium** A state in which a system has its energy distributed in the statistically most probable manner, a state of a system in which forces, influences, reactions, etc., balance each other out so that there is no net change. A body is said to be in thermal equilibrium if no net heat exchange is taking place within it or between it and its surroundings. A system is in chemical equilibrium when a reaction and its reverse are proceeding at equal rates. These are examples of dynamic equilibrium, in which activity in one sense or direction is in aggregate balanced by comparable reverse activity.
3. A pilot plant is a collection of equipment designed and constructed to investigate some critical aspect(s) of a process operation or perform basic research. It is a tool rather than an end in itself. A pilot plant can range in size from a laboratory bench-top unit to a facility only marginally smaller than a commercial unit. The purposes for its construction and operation can vary widely: confirming feasibility of a proposed process; providing design data; determining the economic feasibility of a new process; determining optimum materials of construction; testing operability of a control scheme; determining the extent of plant maintenance; producing sufficient quantities of product for market evaluation; obtaining kinetic data; screening catalysts; proving areas of advanced technology; providing data for solutions to scale-up problems; providing technical support to an existing process or product; assessing process hazards; determining operating costs; optimizing an existing process; and performing basic process research.
4. Synthetic organic chemicals can be defined as derivative products of naturally occurring materials (petroleum, natural gas, and coal) which have undergone at least one chemical reaction, such as oxidation hydrogenation, halogenation, sulfonation, or alkylation.
5. Ethylene continues to far surpass all other hydrocarbons both in volume and in diversity of commercial use. In the whole field of petrochemcials, it is exceeded in tonnage only by synthetic ammonia. The major consumers of ethlyene are low density polyethylene, ethylene oxide, high density polyethylene, ethylene dichloride, ethylbenzene, ethylene oligomers, ethanol, acetaldehyde, vinyl acetate, ethylene-prolylene elastomers, propioaldehyde, ethylene dibromide and other.
6. Organic compounds present a complexity of structures and properties as varied as life itself. Perhaps 10 million organic compounds are now known, each with its unique molecular structure, name, and chemical and physical properties. To bring a sense of order to this enormous number and almost incomprehensible variety of carbon compounds, chemists have organized them into families of compounds of similar molecular structures and similar properties. One of the largest of these is the family of hydrocarbons, composed exclusively of compounds containing just two elements, hydrogen and carbon. The very simplest of the hydrocarbons, with just one carbon atom per molecule and with the lowest molecular weight of all organic compounds, is methane, CH_4.
7. Alkanes are said to be saturated, while alkenes, alkynes, and all other organic compounds containing double or triple bonds are unsaturated. A compound containing a double or triple bond is unsaturated since it is possible to add molecular hydrogen to it until it will take up no more—to saturate it with hydrogen, chemicals other than hydrogen can also add to unsaturated hydrocarbons, converting them to saturated compounds. These, of course, would no longer be classified as hydrocarbons since they would then contain elements other than hydrogen and carbon.
8. While all compounds fitting the general formula C_nH_{2n+2} must be alkanes since they are all fully saturated, not all compounds of the formula C_nH_{2n} are alkenes. Some are cycloalkanes. Still another family of compounds, the aromatic hydrocarbons, is important to the chemistry of gasoline. All aromatic compounds contain at least one highly unsaturated ring of six carbons. The hydrocarbon benzene is the simplest of all of these.