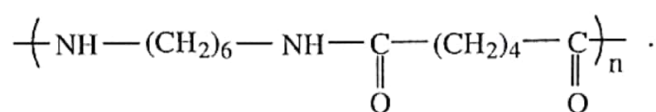


1.1 Nomenclature

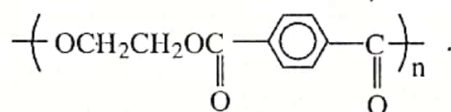
The most widely used nomenclature system for polymers is the one based on the source of the polymer. When the polymer is made from a single worded monomer, it is named by putting the prefix “poly” before the name of the monomer without a space or a hyphen. Thus, the polymers from ethylene, styrene, and propylene are named polyethylene, polystyrene, and polypropylene respectively. However, when the name of the monomer is multiworded or abnormally long or preceded by a letter or a number or carries substituents it is placed under parenthesis, *e.g.*, poly(vinyl chloride), poly(ethylene oxide), poly(chlorotrifluoroethylene), poly(ϵ -caprolactam), *etc.* For some polymers, the source (monomer) may be a hypothetical

one, the polymer being prepared by a modification of another polymer, *e.g.*, poly(vinyl alcohol). The vinyl alcohol monomer does not exist; the polymer is prepared by the hydrolysis of poly(vinyl acetate).

In the above examples, a single monomer forms the repeating unit of the polymer (*vide infra*). However, many polymers exist in which the repeating units are derived from two monomers. Such polymers are named by putting the prefix “poly” before the structural name of the repeating unit placed within parenthesis without a space or a hyphen. Thus, the polyamide with the repeating unit derived from hexamethylenediamine and adipic acid is named poly(hexamethylene adipamide),



Similarly, the polyester with the repeating unit derived from ethylene glycol and terephthalic acid is named poly(ethylene terephthalate).



However, the International Union of Pure and Applied Chemistry have developed a detailed structure-based nomenclature.^{12a,b} In this book, we shall follow the commonly used source-based nomenclature described above.

1.2 Structural and Repeating (or Repeat) Units

Polymers are identified by the structural and repeating units in their chain formulae. A structural unit (or “unit” in short) in a polymer chain represents a residue from a monomer used in the synthesis of the polymer, whereas a repeating unit, or a repeat unit, refers to a structural unit or a covalently bonded combination of two complementary structural units, which is repeated many times to make the whole chain.

The structural and repeating units are identical when a single monomer is used in the preparation of the polymer but not so when more than one monomer is used. Examples are given in Table 1.1. In each of the first five examples in the table, the repeating unit has only one structural unit, whereas in the last two examples the repeating unit in each case is composed of two covalently bonded unlike but complementary structural units.