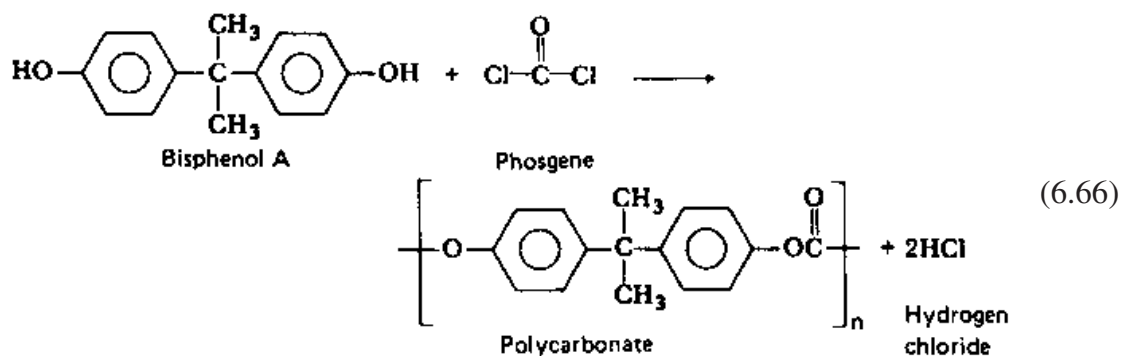


Polycarbonates (PCs), which are polyesters of unstable carbonic acid, are relatively stable polymers that were originally produced by the reaction of phosgene with bisphenol A [2,2-bis(4-hydroxyphenyl) propane] [Eq. (6.66)]. This unusually tough transparent plastic is available under the trade names of Lexan (General Electric) and Merlon (Mobay). Most polycarbonates are produced by the interfacial polymerization of the diol with phosgene. Polycarbonates may also be produced by ester interchange between diphenyl carbonate and bisphenol A.

The melting point of polycarbonates is decreased from 225°C to 195°C when the methyl pendant groups are replaced by propyl groups. The polycarbonate prepared from bis(4-hydroxyphenyl)ether also has a lower melting point and lower glass transition temperature.

Polycarbonates and polycarbonate-polyester copolymers are used for glazing, sealed beam headlights, door seals, popcorn cookers, solar heat collectors, and appliances. Polycarbonate tends to stress-crack in the presence of gasoline, but a 50–50 blend (Xenoy) is unusually resistant to gasoline.



Nonrecordable compact disks (CDs) are made of rigid, transparent polycarbonates such as those given in 6.66 with a reflective metal coating on top of the polycarbonate. A laser is used to encode information through creation of physical features sometimes referred to as “pits and lands” of different reflectivity at the polycarbonate–metal interface.

Recordable CDs contain an organic dye between the polycarbonate and metal film. Here, a laser creates areas of differing reflectiveness in the dye layer through photochemical reactions.

A beam from a semiconductor diode laser “interrogates” the undersides of both types of CDs seeking out areas of reflected, corresponding to the binary “one”, and unreflected, corresponding to the binary “zero,” light. The ability to “read” information is dependent on the wavelength of the laser. Today most of the CD players use a near-infrared laser because of the stability of such lasers. Efforts are underway to develop stable and inexpensive lasers of shorter wavelengths that will allow the holding of more information within the same space.