

8.5.2 Polycarbonates (PC)

Polycarbonates are linear polyesters of carbonic acid. Well-known trade names of polycarbonates are Makrolon (Bayer Material Science), Lexan (SABIC), and Xantar (Mitsubishi). The industrially most important polycarbonate is produced from bisphenol A and phosgene or from diphenyl carbonate (■ Fig. 8.26).

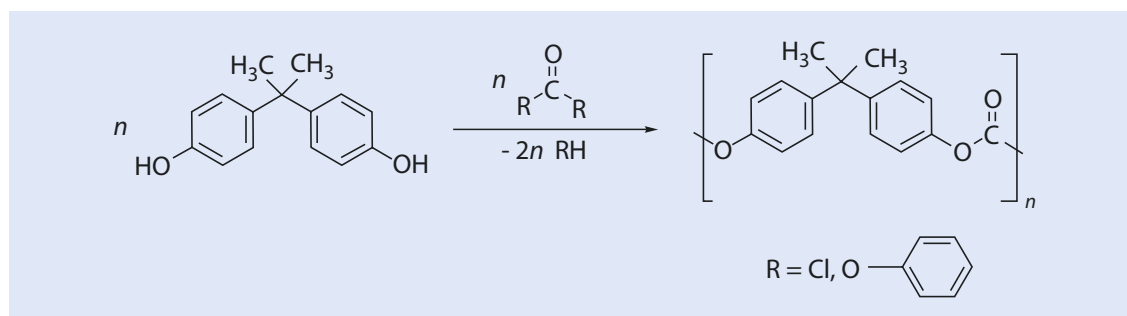
The reaction of bisphenol A with diphenyl carbonate can be performed as a melt condensation; the crucial reaction here is a transesterification.

The reaction between bisphenol A and phosgene is carried out as an interfacial condensation. In this case, the phosgene is in the organic methylene chloride phase and the bisphenol A is present as the disodium salt in an aqueous alkaline solution. The reaction occurs at the phase boundary. A variant is homogeneous polymerization in pyridine.

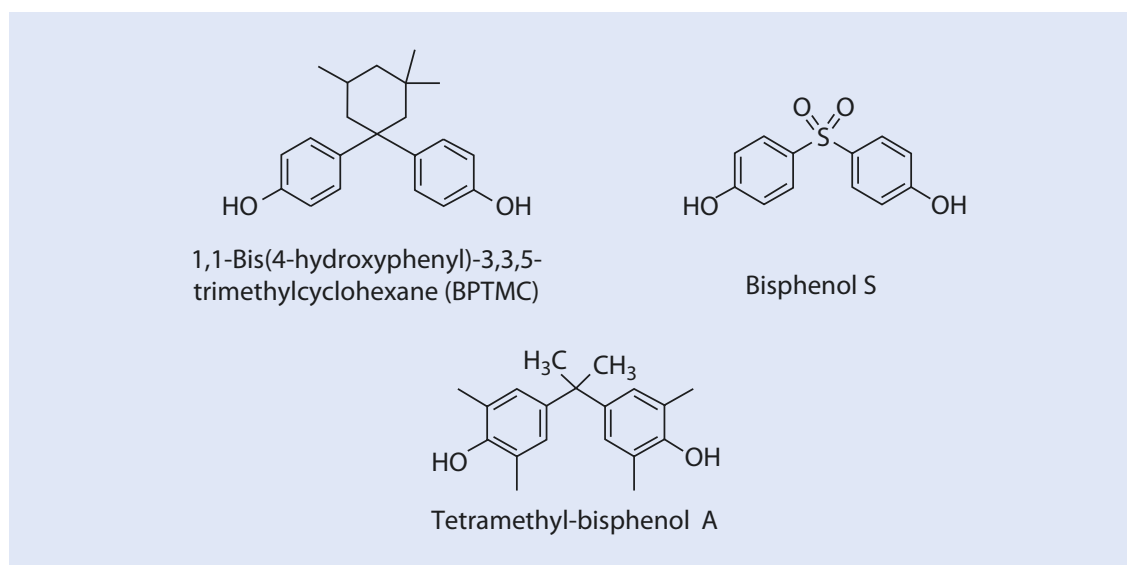
By complete replacement of bisphenol A with other bisphenols (■ Fig. 8.27), important properties of the resulting polycarbonates, such as glass transition temperature and refractive index, can be varied. Polycarbonates from *o,o,o',o'*-tetramethyl-bisphenols are very different from those with unsubstituted bisphenol constituents. They have higher glass transition temperatures and lower melt viscosities and hence are easier to process.

Typical fields of application worth mentioning are terminal strips, special plugs, baby bottles, parts for office machines, film and slide cassettes, optical data storage (CD), headlight reflectors, canopies, soundproof walls, and the side and rear windows of trucks and tractors.

8.5 · Typical Polycondensates



■ **Fig. 8.26** Synthesis of polycarbonates by polycondensation of bisphenol A with phosgene or diphenyl carbonate



■ **Fig. 8.27** Some alternative bisphenols for the preparation of polycarbonates