

[0062] The process is effected in a plurality of stages, as a rule in reactors which are connected in series and in which the molecular weight and hence the viscosity of the polycarbonate is increased stepwise.

[0063] For carrying out the process according to the invention, for example, it is possible to use a plant design as shown in WO-A 02/077 067. The polycarbonate synthesis is carried out by transesterification of diaryl carbonates with dihydroxyaryl compounds in the presence of quaternary onium compounds, an oligocarbonate being prepared in a plurality of evaporator stages at temperatures increasing stepwise and pressures decreasing stepwise, which oligocarbonate is subjected to condensation in one or two basket reactors connected in series at further increasing temperatures and decreasing pressures to give the polycarbonate.

[0064] Dihydroxyaryl compounds suitable for the process according to the invention are those of the general formula (I)



in which Z is an aromatic radical which has 6 to 34 C atoms and may contain one or more optionally substituted aromatic nuclei and aliphatic or cycloaliphatic radicals or alkylaryls or heteroatoms as bridge members.

[0065] Examples of suitable dihydroxyaryl compounds are: dihydroxybenzenes, dihydroxybiphenyls, bis(hydroxyphenyl)alkanes, bis(hydroxyphenyl)cycloalkanes, bis(hydroxyphenyl)aryls, bis(hydroxyphenyl)ethers, bis(hydroxyphenyl)ketones, bis(hydroxyphenyl)sulphides, bis(hydroxyphenyl)sulphones, bis(hydroxyphenyl)sulphoxides, 1,1'-bis(hydroxyphenyl)diisopropylbenzenes and the compounds thereof which are alkylated on the nucleus or halogenated on the nucleus.

[0066] These and further suitable other dihydroxyaryl compounds are described, for example, in DE-A 3 832 396, FR-A 1 561 518, in H. Schnell, Chemistry and Physics of Polycarbonates, Interscience Publishers, New York 1964, page 28 et seq.; page 102 et seq. and in D. G. Legrand, J. T. Bendler, Handbook of Polycarbonate Science and Technology, Marcel Dekker New York 2000, page 72 et seq.

[0067] Preferred dihydroxyaryl compounds are, for example, resorcinol, 4,4'-dihydroxybiphenyl, bis(4-hydroxyphenyl)methane, bis(3,5-dimethyl-4-hydroxyphenyl)methane, bis(4-hydroxyphenyl)diphenylmethane, 1,1-bis(4-hydroxyphenyl)-1-phenylethane, 1,1-bis(4-hydroxyphenyl)-1-(1-naphthyl)ethane, 1,1-bis(4-hydroxyphenyl)-1-(2-naphthyl)ethane, 2,2-bis(4-hydroxyphenyl)propane, 2,2-bis(3-methyl-4-hydroxyphenyl)propane, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)propane, 2,2-bis(4-hydroxyphenyl)-1-phenylpropane, 2,2-bis(4-hydroxyphenyl)hexafluoropropane, 2,4-bis(4-hydroxyphenyl)-2-methylbutane, 2,4-bis(3,5-dimethyl-4-hydroxyphenyl)-2-methylbutane, 1,1-bis(4-hydroxyphenyl)cyclohexane, 1,1-bis(3,5-dimethyl-4-hydroxyphenyl)cyclohexane, 1,1-bis(4-hydroxyphenyl)-4-methylcyclohexane, 1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane, 1,3-bis[2-(4-hydroxyphenyl)-2-propyl]benzene, 1,1'-bis(4-hydroxyphenyl)-3-diisopropylbenzene, 1,1'-bis(4-hydroxyphenyl)-4-diisopropylbenzene, 1,3-bis[2-(3,5-dimethyl-4-hydroxyphenyl)-2-propyl]benzene, bis(4-hydroxyphenyl)ether, bis(4-hydroxyphenyl)sulphide, bis(4-hydroxyphenyl)sulphone, bis(3,5-dimethyl-4-hydroxyphenyl)sulphone and 2,2',3,3'-tetrahydro-3,3',3'-tetramethyl-1,1'-spiro[1H-indene]-5,5'-diol.

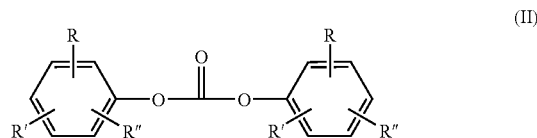
[0068] Particularly preferred dihydroxyaryl compounds are resorcinol, 4,4'-dihydroxybiphenyl, bis(4-hydroxyphenyl)diphenylmethane, 1,1-bis(4-hydroxyphenyl)-1-phenylethane, bis(4-hydroxyphenyl)-1-(1-naphthyl)ethane, bis(4-hydroxyphenyl)-1-(2-naphthyl)ethane, 2,2-bis(4-hydroxyphenyl)propane, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)propane, 1,1-bis(4-hydroxyphenyl)cyclohexane, 1,1-bis(3,5-dimethyl-4-hydroxyphenyl)cyclohexane, 1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane, 1,1'-bis(4-hydroxyphenyl)-3-diisopropylbenzene and 1,1'-bis(4-hydroxyphenyl)-4-diisopropylbenzene.

[0069] Very particularly preferred dihydroxyaryl compounds are 4,4'-dihydroxybiphenyl, 2,2-bis(4-hydroxyphenyl)propane and bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane.

[0070] It is possible to use both a dihydroxyaryl compound with formation of homopolycarbonates and different dihydroxyaryl compounds with formation of copolycarbonates.

[0071] The dihydroxyaryl compounds can also be used with residual contents of the monohydroxyaryl compounds from which they were prepared, and the low molecular weight oligocarbonates with residual contents of the monohydroxyaryl compounds which were eliminated during the preparation of the oligomers. The residual contents of the monohydroxyaryl compounds may be up to 20% by weight, preferably up to 10% by weight, particularly preferably up to 5% by weight and very particularly preferably up to 2% by weight.

[0072] The diaryl carbonates suitable for the reaction with the dihydroxyaryl compounds are those of the general formula (II)



in which

[0073] R, R' and R'', independently of one another, are identical or different and represent hydrogen, linear or branched C₁-C₃₄-alkyl, C₇-C₃₄-alkylaryl or C₆-C₃₄-aryl, and R may furthermore denote —COO—R''', R''' representing hydrogen, linear or branched C₁-C₃₄-alkyl, C₇-C₃₄-alkylaryl or C₆-C₃₄-aryl.

[0074] Preferred diaryl carbonates are, for example, diphenyl carbonate, methylphenyl phenyl carbonates, di(methylphenyl)carbonates, 4-ethylphenyl phenyl carbonate, di(4-ethylphenyl)carbonate, 4-n-propylphenyl phenyl carbonate, di(4-n-propylphenyl) carbonate, 4-isopropylphenyl phenyl carbonate, di(4-isopropylphenyl)carbonate, 4-n-butylphenyl phenyl carbonate, di(4-n-butylphenyl)carbonate, 4-isobutylphenyl phenyl carbonate, di(4-isobutylphenyl)carbonate, 4-tert-butylphenyl phenyl carbonate, di(4-tert-butylphenyl)carbonate, 4-n-pentylphenyl phenyl carbonate, di(4-n-pentylphenyl) carbonate, 4-n-hexylphenyl phenyl carbonate, di(4-n-hexylphenyl)carbonate, 4-isooctylphenyl phenyl carbonate, di(4-isooctylphenyl)carbonate, 4-n-nonylphenyl phenyl carbonate, di(4-n-nonylphenyl)carbonate, 4-cyclohexylphenyl phenyl carbonate, di(4-cyclohexylphenyl)carbonate, 4-(1-methyl-1-phenylethyl)phenyl phenyl carbonate, di[4-(1-methyl-1-phenylethyl)phenyl]carbonate, biphenyl-