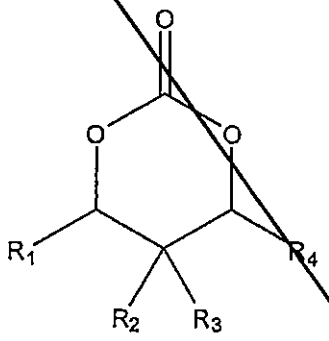
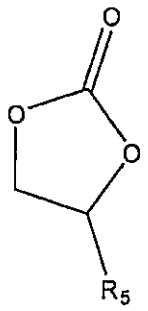
Patent claims

1. Process for the preparation of polycarbonate polyols, characterised in that cyclic carbonate is polymerised in the presence of DMC catalyst and chain-transfer agent consisting of polyether carbonate polyols.

2. Process according to claim 1, wherein the cyclic carbonate is selected from at least one compound of the group comprising the compounds of formulae (I) and (II)



(I)



(II)

wherein

R1, R4 and R5 independently of one another represent hydrogen or a linear or branched C1 to C12 alkyl radical or a C6 to C10 aryl radical, and

R2 and R3 independently of one another represent hydrogen or a linear or branched C1 to C12 alkyl radical or a C6 to C10 aryl radical or an allyloxymethyl radical.

3. Process according to claim 1, wherein the cyclic carbonates are selected from at least one of the compounds of the group comprising trimethylene carbonate, neopentyl glycol carbonate, 2,2,4-trimethyl-1,3-pentanediol carbonate, 2,2-dimethyl-1,3-butanediol carbonate, 1,3-butanediol carbonate, 2-methyl-1,3-propanediol carbonate, 2,4-pentanediol carbonate, 2-methyl-butane-1,3-diol carbonate, TMP-monoallyl ether carbonate, pentaerythritol diallyl ether carbonate, propylene carbonate, phenylethylene carbonate and ethylene carbonate.

4. Process according to claim 1, wherein there is used as the DMC catalyst zinc hexacyanocobaltate(III) which comprises as organic complex ligands *tert*-butanol and a polyether polyol having a number-average molecular weight greater than 500 g/mol.

5. Process according to claim 1, characterised in that trimethylene carbonate is used as the cyclic carbonate.

6. Process according to claim 1, characterised in that the polymerisation of the cyclic carbonate takes place in the presence of DMC catalyst and at least one chain-transfer agent at a reaction temperature of from 60 to 160°C.

7. Process according to claim 1, characterised in that the weight ratio of chain-transfer agent to cyclic carbonate is from 1:0.001 to 1:50.

8. Process according to claim 1, characterised in that

(i) H-functional starter substance, or a mixture of at least two H-functional starter substances, is placed in a reaction vessel, and water and/or other readily volatile compounds are optionally removed ("drying"), wherein the DMC catalyst, the H-functional starter substance, or the mixture of at least two H-functional starter substances, are added before or after the drying,

(ii) alkylene oxides and carbon dioxide are added to the mixture resulting from step (i) ("copolymerisation" with formation of the polyether carbonate polyol chain-transfer agent),

(iii) to the mixture resulting from step (ii) there is added the cyclic carbonate, which can be the same as or different from the cyclic carbonate contained in the mixture resulting from step (ii), wherein the weight ratio of mixture resulting from step (ii) to added cyclic carbonate is from 1:0.001 to 1:50, and the resulting mixture is reacted at a temperature of from 60 to 160°C.

9. Process according to claim 8, characterised in that no DMC catalyst is added in step (iii).

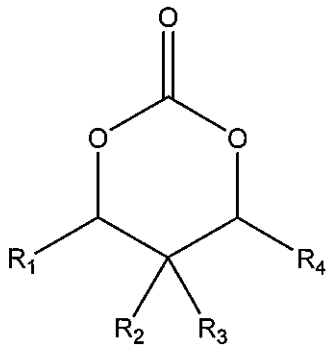
10. Process according to claim 1, characterised in that there is used as the chain-transfer agent a polycarbonate which has been prepared by the process according to claim 1.

11. Aliphatic polycarbonates obtainable by a process according to any one of claims 1 to 10.

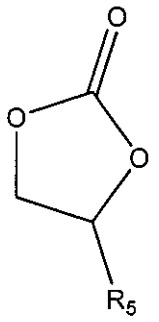
CLAIMS

1. Process for the preparation of polycarbonate polyols, characterised in that cyclic carbonate is polymerised in the presence of double metal cyanide catalysts (DMC catalyst) and chain-transfer agent consisting of polyether carbonate polyols.

2. Process according to claim 1, wherein the cyclic carbonate is selected from at least one compound of the group comprising the compounds of formulae (I) and (II)



(I)



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wherein

R1, R4 and R5 independently of one another represent hydrogen or a linear or branched C1 to C12 alkyl radical or a C6 to C10 aryl radical, and

R2 and R3 independently of one another represent hydrogen or a linear or branched C1 to C12 alkyl radical or a C6 to C10 aryl radical or an allyloxymethyl radical.

3. Process according to claim 1, wherein the cyclic carbonates are selected from at least one of the compounds of the group comprising trimethylene carbonate, neopentyl glycol carbonate, 2,2,4-trimethyl-1,3-pentanediol carbonate, 2,2-dimethyl-1,3-butanediol carbonate, 1,3-butanediol carbonate, 2-methyl-1,3-propanediol carbonate, 2,4-pentanediol carbonate, 2-methyl-butane-1,3-diol carbonate, trimethylolpropane (TMP)-monoallyl ether carbonate, pentaerythritol diallyl ether carbonate, propylene carbonate, phenylethylene carbonate and ethylene carbonate.

4. Process according to claim 1, wherein there is used as the double metal cyanide catalysts (DMC catalyst) zinc hexacyanocobaltate(III) which comprises as organic complex ligands *tert*-butanol and a polyether polyol having a number-average molecular weight greater than 500 g/mol.

5. Process according to claim 1, characterised in that trimethylene carbonate is used as the cyclic carbonate.

6. Process according to claim 1, characterised in that the polymerisation of the cyclic carbonate takes place in the presence of double metal cyanide catalysts (DMC catalyst) and at least one chain-transfer agent at a reaction temperature of from 60 to 160°C.

7. Process according to claim 1, characterised in that the weight ratio of chain-transfer agent to cyclic carbonate is from 1:0.001 to 1:50.

8. Process according to claim 1, characterised in that

(i) H-functional starter substance, or a mixture of at least two H-functional starter substances, is placed in a reaction vessel, and water is optionally removed, wherein the double metal cyanide catalysts (DMC catalyst), the H-functional starter substance, or the mixture of at least two H-functional starter substances, are added before or after the drying,

(ii) alkylene oxides and carbon dioxide are added to the mixture resulting from step (i) ("copolymerisation" with formation of the polyether carbonate polyol chain-transfer agent),

(iii) to the mixture resulting from step (ii) there is added the cyclic carbonate, which can be the same as or different from the cyclic carbonate contained in the mixture resulting from step (ii), wherein the weight ratio of mixture resulting from step (ii) to added cyclic carbonate is from 1:0.001 to 1:50, and the resulting mixture is reacted at a temperature of from 60 to 160°C.

9. Process according to claim 8, characterised in that no double metal cyanide catalysts (DMC catalyst) is added in step (iii).

10. Process according to claim 1, characterised in that there is used as the chain-transfer agent a polycarbonate which has been prepared by the process according to claim 1.