Claims

1. A process for preparing isobutene homopolymers having a weight-average molecular weight of 75 000 to 10 000 000 by polymerization of isobutene in the liquid phase in an inert solvent in the presence of a polymerization catalyst based on Lewis acids, which comprises, in a polymerization reactor, at the same time

   (a) performing the polymerization at temperatures of -80°C to -190°C,

   (b) using, as an inert solvent, one or more C_1 to C_8 hydrocarbons or one or more halogenated C_1 to C_8 hydrocarbons or a mixture thereof and

   (c) using, as a polymerization catalyst, a Lewis acid complex based on boron trifluoride, on iron halides, on aluminum trihalides or on aluminum alkyl halides or a Lewis acid in combination with organic sulfonic acids as initiators,

   and additionally

   (d) performing the polymerization in the presence of at least one reaction accelerator in the form of an ethylenically saturated hydrocarbon compound comprising at least one oxygen atom and no abstractable proton, and/or

   (e) performing the polymerization in the presence of at least one chain length regulator comprising at least one tertiary olefinic carbon atom.

2. The process according to claim 1, wherein measures (d) and (e) are both performed.

3. The process according to claim 1 or 2, wherein, as measure (a), the polymerization is performed at temperatures of less than -160°C to -185°C.

4. The process according to claim 1 or 2, wherein, as measure (a), the polymerzation is performed at temperatures of -110°C to -140°C.

5. The process according to claims 1 to 4, wherein measure (a) is executed by bringing the polymerization medium to the required low temperature and keeping it there during the polymerization by means of a separate cooling circuit.

6. The process according to claims 1 to 5, wherein, as measure (b), the inert solvent used is ethane, ethene, propane, propene, n-butane, isobutane or a mixture thereof.

7. The process according to claims 1 to 5, wherein, as measure (b), the inert solvent used is 1,1,1,2,3,3,3-heptafluoropropane, octafluoropropane or a mixture thereof.

8. The process according to claims 1 to 7, wherein, as measure (c), the polymerization catalyst used is a complex of boron trifluoride and a proton source.

9. The process according to claim 8, wherein, as measure (c), the polymerization catalyst used is a complex of boron trifluoride and a C_1- to C_4-alkanol.

10. The process according to claims 1 to 9, wherein, as measure (d), the polymerization is performed in the presence of at least one reaction accelerator selected from ketones, aldehydes, ethers, acetals and hemiacetals.

11. The process according to claims 1 to 10, wherein, as measure (e), the polymerization is performed in the presence of isoprene and/or diisobutene as chain length regulators.

12. The process according to claims 1 to 11, wherein the polymerization conditions are selected such that the isobutene used is converted in the polymerization reactor with a conversion of at least 90% to isobutene homopolymers having a weight-average molecular weight of 75 000 to 10 000 000.

13. The process according to claims 1 to 12, wherein the isobutene homopolymers obtained in the polymerization reactor are discharged from the polymerization reactor at temperatures of less than -80°C and subjected to a thermal purification process at temperatures of more than +80°C.

14. The process according to claim 13, wherein the thermal purification process is executed using one or more extruders.

Claims

1. A process for preparing isobutene homopolymers having a weight-average molecular weight of 75 000 to 10 000 000 by polymerization of isobutene in the liquid phase in an inert solvent in the presence of a polymerization catalyst based on Lewis acids, which comprises, in a polymerization reactor, at the same time

   (a) performing the polymerization at temperatures of -80°C to -190°C,

   (b) using, as an inert solvent, one or more C_1 to C_8 hydrocarbons or one or more halogenated C_1 to C_8 hydrocarbons or a mixture thereof and

   (c) using, as a polymerization catalyst, a Lewis acid complex based on boron trifluoride, on iron halides, on aluminum trihalides or on aluminum alkyl halides or a Lewis acid in combination with organic sulfonic acids as initiators,

   and additionally

   (d) performing the polymerization in the presence of at least one reaction accelerator in the form of an ethylenically saturated hydrocarbon compound comprising at least one oxygen atom and no abstractable proton, and/or

   (e) performing the polymerization in the presence of at least one chain length regulator comprising at least one tertiary olefinic carbon atom,

   the isobutene homopolymers obtained in the polymerization reactor being discharged from the polymerization reactor at temperatures of less than -80°C and subjected to a thermal purification process in one or more extruders at temperatures of more than +80°C.

2. The process according to claim 1, wherein measures (d) and (e) are both performed.

3. The process according to claim 1 or 2, wherein, as measure (a), the polymerization is performed at temperatures of less than -160°C to -185°C.

4. The process according to claim 1 or 2, wherein, as measure (a), the polymerzation is performed at temperatures of -110°C to -140°C.

5. The process according to claims 1 to 4, wherein measure (a) is executed by bringing the polymerization medium to the required low temperature and keeping it there during the polymerization by means of a separate cooling circuit.

6. The process according to claims 1 to 5, wherein, as measure (b), the inert solvent used is ethane, ethene, propane, propene, n-butane, isobutane or a mixture thereof.

7. The process according to claims 1 to 5, wherein, as measure (b), the inert solvent used is 1,1,1,2,3,3,3-heptafluoropropane, octafluoropropane or a mixture thereof.

8. The process according to claims 1 to 7, wherein, as measure (c), the polymerization catalyst used is a complex of boron trifluoride and a proton source.

9. The process according to claim 8, wherein, as measure (c), the polymerization catalyst used is a complex of boron trifluoride and a C_1- to C_4-alkanol.

10. The process according to claims 1 to 9, wherein, as measure (d), the polymerization is performed in the presence of at least one reaction accelerator selected from ketones, aldehydes, ethers, acetals and hemiacetals.

11. The process according to claims 1 to 10, wherein, as measure (e), the polymerization is performed in the presence of isoprene and/or diisobutene as chain length regulators.

12. The process according to claims 1 to 11, wherein the polymerization conditions are selected such that the isobutene used is converted in the polymerization reactor with a conversion of at least 90% to isobutene homopolymers having a weight-average molecular weight of 75 000 to 10 000 000.