Claims

1. Process for preparing polyether polyols having n E_n blocks each comprising at least 75% by weight of oxyethylene units, and m A_m blocks being different from the E_n blocks, where n and m are each natural numbers from 1 to 10, wherein at least one starter compound having at least one Zerevitinov-active hydrogen atom is being reacted in the process with ethylene oxide and at least one further alkylene oxide compound with addition of a catalyst, and the at least one starter compound having a melting point of ≥40°C,

characterized in that

the reaction with ethylene oxide is effected during the metered addition of the E_n block(s) under the conditions of the following inequation:

$$\frac{T_n * x(cat) * t_n}{x_n(EO)} > 2.9 \quad \text{in [°C * h]} \qquad (1)$$

where

T_n is defined as the mean reaction temperature in °C during the metered addition of the ethylene oxide for the E_n block,

x(cat) is defined as the amount of catalyst used in mol,

t_n is defined as the metering time for the ethylene oxide in the E_n block in hours,

$x_n(EO)$ is defined as the amount of ethylene oxide metered in for the E_n block in mol, and

n is as defined above,

and where the total content of oxyethylene units in the polyether polyols, based on the total mass of all the alkylene oxides metered in, is from 5 to 85% by weight.

2. Process according to Claim 1, characterized in that the OH number during the reaction of the at least one starter compound with ethylene oxide and at least one further alkylene oxide compound decreases and the following inequation (3) applies:

$$T_a * x(cat)/m_a < 12.5$$

in [°C * mol/kg] (3)

with

T_a as the mean reaction temperature in °C during the reaction of the at least one starter compound,

x(cat) as the amount of catalyst used in mol and

m_a as the mass of the mixture in kg on completion of conversion of the at least one starter compound,

where the inequation (3) applies particularly from an OH number of 1000 mg KOH/g or less, preferably from 850 mg KOH/g or less.

3. Process according to Claim 2, characterized in that the inequation (3) applies up to an OH number of 215 mg KOH/g and m_a denotes the mass of the mixture in kg when the OH number of 215 mg KOH/g is passed.

4. Process according to any of the preceding claims, characterized in that the OH numbers of the polyether polyols are from 28 mg KOH/g to 500 mg KOH/g.

5. Process according to any of the preceding claims, characterized in that the polyether polyols, aside from the structural units originating from the starter, consist exclusively of the E_n and A_m blocks.

6. Process according to any of the preceding claims, characterized in that at least one A_m block, preferably all A_m blocks, comprise(s) not more than 25% by weight of oxyethylene units.

7. Process according to any of the preceding claims, characterized in that the polyether polyols contain up to 45% by weight, preferably 30% by weight of oxyethylene units, based on the total mass of all the alkylene oxides metered in.

8. Process according to any of the preceding claims, characterized in that at least one further starter compound having a melting point < 40°C is used in a proportion of up to 30% by weight based on the total mass of all starter compounds.

9. Process according to any of the preceding claims, characterized in that no solvents are used in the reaction of the starter compound with ethylene oxide and the at least one further alkylene oxide compound.

10. Process according to any of the preceding claims, characterized in that the catalyst is a basic catalyst, especially potassium hydroxide, and/or in that the catalyst is used in a concentration, based on the amount of end product, of 0.004 to 1.0% by weight, especially of 0.02 to 1.0% by weight.

11. Process according to any of the preceding claims, characterized in that at least one E_n block contains at least 90% by weight of oxyethylene units.

12. Process according to any of the preceding claims, characterized in that one E_n block is an end block.

13. Process according to any of the preceding claims, characterized in that the reaction of the at least one starter compound with ethylene oxide and at least one further alkylene oxide compound is effected at a temperature of 70 to 170°C, especially of 100 to 160°C.

14. Process according to any of the preceding claims, characterized in that the starter compound used is pentaerythritol, sucrose, trimethylolpropane and/or sorbitol.

15. Process according to any of the preceding claims, characterized in that the alkylene oxides used are ethylene oxide and propylene oxide.

16. Polyether polyols prepared by a process according to any of Claims 1 to 15.

Claims

1. Process for preparing polyether polyols having n E_n blocks each comprising at least 75% by weight of oxyethylene units, and m A_m blocks being different from the E_n blocks, where n and m are each natural numbers from 1 to 10, wherein at least one starter compound having at least one Zerevitinov-active hydrogen atom is being reacted in the process with ethylene oxide and at least one further alkylene oxide compound with addition of a catalyst, and the at least one starter compound having a melting point of ≥40°C,

characterized in that

the reaction with ethylene oxide is effected during the metered addition of the E_n block(s) under the conditions of the following inequation:

$$\frac{T_n * x(cat) * t_n}{x_n(EO)} > 2.9 \quad \text{in [°C * h]} \qquad (1)$$

where

T_n is defined as the mean reaction temperature in °C during the metered addition of the ethylene oxide for the E_n block,

x(cat) is defined as the amount of catalyst used in mol,

t_n is defined as the metering time for the ethylene oxide in the E_n block in hours,

$x_n(EO)$ is defined as the amount of ethylene oxide metered in for the E_n block in mol, and

n is as defined above,

and where the total content of oxyethylene units in the polyether polyols, based on the total mass of all the alkylene oxides metered in, is from 5 to 85% by weight, and characterized in that no solvents are used in the reaction of the starter compound with ethylene oxide and the at least one further alkylene oxide compound.

2. Process according to Claim 1, characterized in that the OH number during the reaction of the at least one starter compound with ethylene oxide and at least one

further alkylene oxide compound decreases and the following inequation (3) applies:

$$T_a * x(cat)/m_a < 12.5 \quad \text{in [°C * mol/kg]} \qquad (3)$$

with

T_a as the mean reaction temperature in °C during the reaction of the at least one starter compound,

x(cat) as the amount of catalyst used in mol and

m_a as the mass of the mixture in kg on completion of conversion of the at least one starter compound,

where the inequation (3) applies particularly from an OH number of 1000 mg KOH/g or less, preferably from 850 mg KOH/g or less.

3. Process according to Claim 2, characterized in that the inequation (3) applies up to an OH number of 215 mg KOH/g and m_a denotes the mass of the mixture in kg when the OH number of 215 mg KOH/g is passed.

4. Process according to any of the preceding claims, characterized in that the OH numbers of the polyether polyols are from 28 mg KOH/g to 500 mg KOH/g.

5. Process according to any of the preceding claims, characterized in that the polyether polyols, aside from the structural units originating from the starter, consist exclusively of the E_n and A_m blocks.

6. Process according to any of the preceding claims, characterized in that at least one A_m block, preferably all A_m blocks, comprise(s) not more than 25% by weight of oxyethylene units.

7. Process according to any of the preceding claims, characterized in that the polyether polyols contain up to 45% by weight, preferably 30% by weight of oxyethylene units, based on the total mass of all the alkylene oxides metered in.

8. Process according to any of the preceding claims, characterized in that at least one further starter compound having a melting point < 40°C is used in a proportion of up to 30% by weight based on the total mass of all starter compounds.

9. Process according to any of the preceding claims, characterized in that the catalyst is a basic catalyst, especially potassium hydroxide, and/or in that the catalyst is used in a concentration, based on the amount of end product, of 0.004 to 1.0% by weight, especially of 0.02 to 1.0% by weight.

10. Process according to any of the preceding claims, characterized in that at least one E_n block contains at least 90% by weight of oxyethylene units.

11. Process according to any of the preceding claims, characterized in that one E_n block is an end block.

12. Process according to any of the preceding claims, characterized in that the reaction of the at least one starter compound with ethylene oxide and at least one further alkylene oxide compound is effected at a temperature of 70 to 170°C, especially of 100 to 160°C.

13. Process according to any of the preceding claims, characterized in that the starter compound used is pentaerythritol, sucrose, trimethylolpropane and/or sorbitol.

14. Process according to any of the preceding claims, characterized in that the alkylene oxides used are ethylene oxide and propylene oxide.