

Tannin-containing polyols, their production and use

Description

- 5 The present invention relates to tannin-containing polyols, their production and use.

Polyols, in particular polyether polyols, are manufactured in great amounts and are used, inter alia, for the production of polyurethanes (PU), for example PU soft foams or PU rigid foams.

- 10 There has been a growing demand in the industry to provide polyols produced using natural raw materials. In this context, the term "natural raw materials" refers to materials from renewable sources, like trees or other naturally growing plants.

- 15 US 3,546,199 and US 3,654,194 disclose a process for producing lignin and tannin alkoxylates by using ethylene carbonate as reagent and solvent, involving NaOH or KOH as catalysts. The use of ethylene carbonate and the use of NaOH or KOH as catalyst make a work-up necessary for use in PU applications. The viscosity of the obtained products is still relatively high, considering the OH number.

- 20 Thus, the known products and processes have some disadvantages. For example, the known processes often lead to highly viscous products which cannot properly be used for the production of polyurethanes. Furthermore, most often a complicated and expensive work-up procedure is required, which also leads to the production of waste and a low efficiency with regard to the used starting materials.

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Thus, one object of the present invention was to overcome the disadvantages mentioned above, for example the necessity for a tedious work-up procedure. In particular, it was one object of the present invention to obtain liquid products which can be used to produce polyurethane products.

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Another object was to provide a polyol which is at least partially based on sustainable (i. e. naturally occurring and renewable) raw materials (as opposed to mineral oil based raw materials).

- 35 Surprisingly, the inventors have found that the obtained products also have a high pentane compatibility in comparison to standard polyols based on polyfunctional alcohols such as glycerin or sorbitol.

Besides, the inventive polyols may provide for improved flame protection in the resulting polyurethanes.

- 40 The object of the present invention is, inter alia, a process for the production of a tannin containing polyol P by reacting 1 to 30 % by weight tannin T, 1 to 30 % by weight of at least one polyol S with a functionality of between 2 and 6 and at least one alkylene oxide A with 2 to 4 C-atoms

per molecule, in the presence of between 50 ppm and 50000 ppm of at least one basic catalyst C, each based on the cumulative amount of T, S, A and C.

Other objects of the present invention include

- 5 • a tannin containing polyol P, obtainable by the inventive process,
 • the use of a tannin containing polyol P, obtainable by the inventive process, for the pro-
 duction of polyurethanes, and
 • a tannin containing polyol P with a viscosity of between 500 and 80000 mPas, containing
10 1 to 30 % by weight tannin T, 1 to 30 % by weight of at least one polyol S with a function-
 ality of between 2 and 6 and at least one alkylene oxide A with 2 to 4 C-atoms per mole-
 cule, each based on the cumulative amount of T, S, A and C, obtained by reaction of
 components T, S and A in the presence of between 50 ppm and 50000 ppm of at least
 one basic catalyst C.
- 15 The tannin-containing polyols of the present invention may advantageously be used for the pro-
 duction of polyurethanes, by reaction with at least one di- or polyisocyanate. Furthermore, the
 inventive tanning-containing polyols and the polyols obtainable by the inventive process may
 also be used for cosmetics applications without a previous work-up.
- 20 In a preferred embodiment of the inventive process, 40 to 90 % by weight, preferably 50 to 80 %
 by weight, based on the cumulative amount of T, S, A and C, of alkylene oxide A is used.
 In another embodiment of the inventive process, polyol P differs from polyol S.
 In another preferred embodiment of the inventive process, the tannin containing polyol P is liq-
 uid at 25 °C.
- 25 In another embodiment of the inventive process, the tannin containing polyol P has a viscosity
 of between 200 to 80000 mPas, preferably between 200 and 30000 mPas.
 In another embodiment of the inventive process, the tannin T is selected from hydrolysable and/
 or non-hydrolysable tannins.
- 30 In another embodiment of the inventive process, the tannin T is selected from myrobalan and/or
 mimosa.
- 35 In another embodiment of the inventive process, the polyol S is selected from glycerine, sorbitol,
 diethylene glycol, dipropylene glycol, trimethylol propane, toluene diamine TMP, TDA, ethylene
 glycol and EO- and/ or PO-containing polyols and mixtures thereof, preferably from glycerine
 and /or dipropylene glycol.
- 40 In another embodiment of the inventive process, the alkylene oxide A is selected from ethylene
 oxide and/ or propylene oxide, preferably propylene oxide.

In another embodiment of the inventive process, the catalyst C is a basic organic or inorganic catalyst, preferably a basic organic catalyst.

5 In another embodiment of the inventive process, the basic catalyst C is selected from KOH, CsOH, NaOH and/ or nitrogen-containing catalysts, preferably from nitrogen-containing catalysts.

10 In a preferred embodiment of the inventive process, the basic catalyst C is selected from DME-OA and/ or imidazole, preferably imidazole.

In another embodiment of the inventive process, 5 to 25 % by weight of tannin T is used, based on the cumulative amount of T, S, A and C.

15 In another embodiment of the inventive process, 4 to 25 % by weight of polyol S is used, based on the cumulative amount of T, S, A and C.

In another embodiment of the inventive process, 100 ppm to 5000 ppm of catalyst C is used, based on the cumulative amount of T, S, A and C.

20 Examples

In the following section, a number of examples are given to illustrate some aspects of the present invention.

The hydroxyl number was determined in accordance with DIN 53240 (DIN = "Deutsche Industrienorm", i. e. German industry standard).

25 The viscosity of the polyols was, unless indicated otherwise, determined at 25°C in accordance with DIN EN ISO 3219 by means of a Rheotec RC20 rotational viscometer using the spindle CC 25 DIN (spindle diameter: 12.5 mm; internal diameter of measuring cylinder: 13.56 mm) at a shear rate of 50 /1s.

30 The pentane compatibility was determined by stepwise addition of pentane to the product. To exactly 100 g of sample pentane was added and mixed. If the mixture was neither turbid nor biphasic more pentane was added and mixed again. In case the mixture was biphasic pentane was evaporated at room temperature until a homogeneous and clear product was obtained. The amount of added pentane was determined by comparing the weight of the mixture with the
35 weight of the starting component. In case the mixture was turbid the sample was sealed and stored at room temperature until a clear phase separation occurred. Afterwards the same process as described above for biphasic systems was applied.

Comparative example A

40 Lupranol 3300 is a trifunctional polyether polyol based on glycerine. It contains mostly secondaryhydroxyl groups and an OHv of 400 mg KOH/g sample. The pentane compatibility at room temperature is 35%.

Comparative example B

Lupranol® 9346 is a polyether polyol based on sucrose. It contains mostly secondary hydroxyl groups and an OHv of 450 mg KOH/g sample (Viscosity (25°C): 18400 mPa*s). The pentane compatibility at room temperature is 12%.

Comparative example C

Polyether polyol based on Sucrose. It contains mostly secondary hydroxyl groups and an OHv of 417 mg KOH/g sample (Viscosity (25°C): 30000 mPa*s). The pentane compatibility at room temperature is 13%.

Comparative example D

Polyether polyol based on Sucrose. It contains mostly secondary hydroxyl groups and an OHv of 511 mg KOH/g sample (Viscosity (25°C): 30000 mPa*s). The pentane compatibility at room temperature is 9%.

Comparative example E

Polyether polyol based on Sucrose. It contains mostly secondary hydroxyl groups and an OHv of 519 mg KOH/g sample (Viscosity (25°C): 74179 mPa*s). The pentane compatibility at room temperature is 7%.

Example 1

36.2 g of glycerine, 36.2 g of Myrobalan and 500 ppm of imidazole were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 120 °C and 167.5 g of PO were added. After complete addition of the PO the reaction mixture was stirred for 9 hours and half. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid (221.1 g) at room temperature (25 °C).

Hydroxyl number: 527 mg KOH/g

Viscosity (25°C): 2930 mPa*s

Pentane compatibility: 10.7%

Example 2

36.2 g of glycerine, 36.2 g of Mimosa and 500 ppm of imidazole were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 120 °C

and 167.5 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 14 hours and 45 minutes. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (219.0 g).

Hydroxyl number: 515.5 mg KOH/g

Viscosity (25°C): 5560 mPa*s

Pentane compatibility: 10.7%

Example 3

5 27.6 g of glycerine, 27.6 g of Mimosa and 500 ppm of imidazole were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 120 °C

and 184.7 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 12 hours. The mixture was subsequently evacuated under reduced pressure
10 for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (218.0 g).

Hydroxyl number: 399.5 mg KOH/g

Viscosity (25°C): 1970 mPa*s

Pentane compatibility: 21.3%

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Example 4

27.6 g of glycerine, 27.6 g of Myrobalan and 500 ppm of imidazole were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 120 °C and 184.7 g of PO were added. After complete addition of the PO
20 the reaction mixture was stirred for another 12 hours and half. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (214.0 g).

Hydroxyl number: 412.9 mg KOH/g

Viscosity (25°C): 1400 mPa*s

25 Pentane compatibility: 20.0%

Example 5

17.2 g of glycerine, 17.2 g of Mimosa and 1000 ppm of imidazole were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature
30 was increased to 130 °C

and 205.4 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (208.0 g).

35 Hydroxyl number: 273.7 mg KOH/g

Viscosity (25°C): 701 mPa*s

Example 6

17.2 g of glycerine, 17.2 g of Mimosa and 1000 ppm of imidazole (50% water solution) were
40 placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 205.4 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was

subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (206.4 g).

Hydroxyl number: 270.6 mg KOH/g

Viscosity (25°C): 698 mPa*s

5 Pentane compatibility: >100%

Example 7

20.7 g of glycerine, 20.7 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was
10 started. The temperature was increased to 130 °C and 198.5 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (211.0 g).

Hydroxyl number: 315.8 mg KOH/g

15 Viscosity (25°C): 859 mPa*s

Pentane compatibility: 37.1%

Example 8

27.6 g of glycerine, 27.6 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was
20 started. The temperature was increased to 130 °C and 184.7 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (219.0 g).

25 Hydroxyl number: 410.6 mg KOH/g

Viscosity (25°C): 1940 mPa*s

Pentane compatibility: 20.0%

Example 9

34.5 g of glycerine, 34.5 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was
30 started. The temperature was increased to 130 °C and 170.9 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product
35 was obtained as a liquid at room temperature (225.4.0 g).

Hydroxyl number: 519.9 mg KOH/g

Viscosity (25°C): 4290 mPa*s

Pentane compatibility: 10.7%

40 Example 10

17.2 g of glycerine, 17.2 g of Myrobalan and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was

started. The temperature was increased to 130 °C and 205.4 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (225.4.0 g).

- 5 Hydroxyl number: 271.3 mg KOH/g
Viscosity (25°C): 602 mPa*s
Pentane compatibility: >100%

Example 11

- 10 20.7 g of glycerine, 20.7 g of Myrobalan and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 198.5 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product
15 was obtained as a liquid at room temperature (215.9 g).

Hydroxyl number: 325.1 mg KOH/g
Viscosity (25°C): 781 mPa*s
Pentane compatibility: 35.1%

20 Example 12

- 27.6 g of glycerine, 27.6 g of Myrobalan and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 184.7 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was
25 subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (224.2 g).

Hydroxyl number: 414.4 mg KOH/g
Viscosity (25°C): 1390 mPa*s
Pentane compatibility: 20.0%

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Example 13

- 34.5 g of glycerine, 34.5 g of Myrobalan and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 170.9 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was
35 subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (217.2 g).

Hydroxyl number: 507.2 mg KOH/g
Viscosity (25°C): 2390 mPa*s

- 40 Pentane compatibility: 13.8%

Example 14

80.2 g of a glycerine based polyetherols (OHv = 400), 38.6 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 120.9 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 4 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (216.6 g).

Hydroxyl number: 395.3 mg KOH/g

Viscosity (25°C): 3850 mPa*s

Pentane compatibility: 20.0%

Example 15

65.8 g of a glycerine based polyetherols (OHv = 400), 42.1 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 131.8 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 5 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (217.4 g).

Hydroxyl number: 385.6 mg KOH/g

Viscosity (25°C): 6140 mPa*s

Pentane compatibility: 19.4%

Example 16

54.7 g of a glycerine based polyetherols (Hydroxyl number = 400), 44.8 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 140.3 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 5 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (216.8 g).

Hydroxyl number: 384.0 mg KOH/g

Viscosity (25°C): 7910 mPa*s

Pentane compatibility: 19.4%

Example 17

71.5 g of dipropylene glycol, 21.8 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 146.4 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 5 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (212.7 g).

Hydroxyl number: 408.8 mg KOH/g

Viscosity (25°C): 290 mPa*s

Pentane compatibility: 43.8%

Example 18

5 116.6 g of sorbitol based polyetherols (Hydroxyl number = 490), 16.1 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to 130 °C and 107.0 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 5 hours. The mixture was subsequently evacuated under reduced pressure
10 for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (212.4 g).

Hydroxyl number: 381.8 mg KOH/g

Viscosity (25°C): 7540 mPa*s

Pentane compatibility: 22.5%

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Example 19

45.8 g of a glycerine based polyetherols (Hydroxyl number = 400), 47.0 g of Mimosa and 1000 ppm of imidazole (50% water solution) were placed in a 300 mL reactor. The reactor was sealed, flushed with nitrogen and the stirrer was started. The temperature was increased to
20 130 °C and 147.0 g of PO were added. After complete addition of the PO the reaction mixture was stirred for another 5 hours. The mixture was subsequently evacuated under reduced pressure for 40 minutes at 100 °C. The final product was obtained as a liquid at room temperature (222.8 g).

Hydroxyl number: 379.3 mg KOH/g

25 Viscosity (25°C): 8920 mPa*s

Pentane compatibility: 19.4%

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Mimosa = tannin extract derived from the bark of the Black Wattle tree, a species of *Acacia* native to Australia

Myrobalan = tannin extract derived from the Myrobalan (*Terminalia chebula*) tree.

In comparison to comparative example C, the examples 3, 4, 8, 12, 14, 15, 16, 17, 18 and 19 show improved pentane compatibility by comparable OH-values. The viscosities of these examples are significantly reduced in comparison to comparative example C.

35 In comparison to comparative example D and E, the examples 1, 2, 9 and 13 show improved pentane compatibility by comparable OH-values. The viscosities of these examples are significantly reduced in comparison to comparative examples D and E.

In comparison to comparative example B, example 13 shows improved pentane compatibility by comparable OH-values. The viscosity of this example is significantly reduced in comparison to
40 comparative example B.

Furthermore, due to the use of the preferred catalyst (organic, nitrogen-containing basic catalyst), no work-up is necessary after the reaction. The catalyst may remain in the product.

Claims

1. Process for the production of a tannin containing polyol P by reacting 1 to 30 % by weight tannin T, 1 to 30 % by weight of at least one polyol S with a functionality of between 2 and 6 and at least one alkylene oxide A with 2 to 4 C-atoms per molecule, in the presence of between 50 ppm and 50000 ppm of at least one basic catalyst C, each based on the cumulative amount of T, S, A and C, wherein the catalyst C is a basic organic catalyst, selected from nitrogen-containing catalysts.
2. Process for the production of a tannin containing polyol P according to claim 1, wherein 40 to 90 % by weight, preferably 50 to 80 % by weight, based on the cumulative amount of T, S, A and C, of alkylene oxide A is used.
3. Process for the production of a polyol P according to claim 1 or 2, wherein polyol P differs from polyol S.
4. Process for the production of a polyol P according to any of the preceding claims, wherein the tannin containing polyol P is liquid at 25 °C.
5. Process for the production of a polyol P according to any of the preceding claims, wherein the tannin containing polyol P has a viscosity of between 200 to 80000 mPas, preferably between 200 and 30000 mPas.
6. Process for the production of a polyol P according to any of the preceding claims, wherein the tannin T is selected from hydrolysable and/or non-hydrolysable tannins.
7. Process for the production of a polyol P according to any of the preceding claims, wherein the tannin T is selected from myrobalan and/or mimosa.
8. Process for the production of a polyol P according to any of the preceding claims, wherein the polyol S is selected from glycerine, sorbitol, diethylene glycol, dipropylene glycol, trimethylol propane, toluene diamine TMP, TDA, ethylene glycol and EO- and/or PO-containing polyols and mixtures thereof, preferably from glycerine and/or dipropylene glycol.
9. Process for the production of a polyol P according to any of the preceding claims, wherein the alkylene oxide A is selected from ethylene oxide and/or propylene oxide, preferably propylene oxide.
10. Process for the production of a polyol P according to any of the preceding claims, wherein the basic catalyst C is selected from DMEOA and/or imidazole, preferably imidazole.

11. Process for the production of a polyol P according to any of the preceding claims, wherein 5 to 25 % by weight of tannin T is used, based on the cumulative amount of T, S, A and C.
- 5 12. Process for the production of a polyol P according to any of the preceding claims, wherein 4 to 25 % by weight of polyol S is used, based on the cumulative amount of T, S, A and C.
13. Process for the production of a polyol P according to any of the preceding claims, wherein 100 ppm to 5000 ppm of catalyst C is used, based on the cumulative amount of T, S, A and C.
- 10 14. Tannin containing polyol P, obtainable by the process of any of claims 1 to 13.
- 15 15. Use of a tannin containing polyol P, obtainable by the process of any of claims 1 to 13, for the production of polyurethanes.
- 16 16. Tannin containing polyol P with a viscosity of between 500 and 80000 mPas, containing 1 to 30 % by weight tannin T, 1 to 30 % by weight of at least one polyol S with a functionality of between 2 and 6 and at least one alkylene oxide A with 2 to 4 C-atoms per molecule, each based on the cumulative amount of T, S, A and C, obtained by reaction of components T, S and A in the presence of between 50 ppm and 50000 ppm of at least one basic catalyst C, wherein the basic catalyst C is selected from nitrogen-containing catalysts.
- 20 17. Tannin containing polyol according to claim 16, containing 40 to 90 % by weight, preferably 50 to 85 % by weight, of alkylene oxide A.
- 25 18. Tannin containing polyol according to claim 16 or 17, wherein polyol P differs from polyol S.
- 30 19. Tannin containing polyol according to any of claims 16 to 18, wherein the tannin containing polyol P is liquid at 25 °C.
- 35 20. Tannin containing polyol according to any of claims 16 to 19, wherein the tannin containing polyol P has a viscosity of between 200 to 80000 mPas, preferably between 200 and 30000 mPas.
- 40 21. Tannin containing polyol according to any of claims 16 to 20, wherein the tannin T is selected from hydrolysable and/or non-hydrolysable tannins.
22. Tannin containing polyol according to any of claims 16 to 21, wherein the tannin T is selected from myrobalan and/or mimosa.

23. Tannin containing polyol according to any of claims 16 to 22, wherein the polyol S is selected from glycerine, sorbitol, diethylene glycol, dipropylene glycol, trimethylol propane, toluene diamine TMP, TDA, ethylene glycol and EO- and/or PO-containing polyols and mixtures thereof, preferably from glycerine and/or dipropylene glycol.
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24. Tannin containing polyol according to any of claims 16 to 23, wherein the alkylene oxide A is selected from ethylene oxide and/or propylene oxide, preferably propylene oxide.
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25. Tannin containing polyol according to any of claims 16 to 24, wherein the basic catalyst C is selected from DMEA and/or imidazole, preferably imidazole.
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26. Tannin containing polyol according to any of claims 16 to 25, wherein the tannin containing polyol contains 5 to 25 % by weight of tannin T, based on the cumulative amount of T, S, A and C.
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27. Tannin containing polyol according to any of claims 16 to 26, wherein the tannin containing polyol contains 4 to 25 % by weight of polyol S, based on the cumulative amount of T, S, A and C.
28. Tannin containing polyol according to any of claims 16 to 27, wherein 100 ppm to 5000 ppm of catalyst C is used, based on the cumulative amount of T, S, A and C.