better drying of the filter cake; hence the product loss cannot be avoided. To have a better drying of the filter cake, larger crystals of the salt are necessary, which requires a long crystallization time. This limits the production capacity of the process. The disposal of the filter cake containing polyether polyol adds up to the waste disposal costs.

Therefore, it is an object of the disclosure~~invention~~ to provide a process for working-up a reaction mixture comprising polyetherol and dissolved alkali metal comprising catalyst which does not exhibit the disadvantages of the known processes.

~~This object is achieved by~~In a first aspect, there is provided a process for working-up a reaction mixture comprising polyetherol and dissolved alkali metal comprising catalyst, wherein at least alkali metal ions of the dissolved alkali metal comprising catalyst are removed from the mixture by a membrane separation process, the process comprising following steps:

(a) feeding the reaction mixture comprising polyetherol and dissolved alkali metal comprising catalyst into a first chamber of a separation unit,

(b) feeding a solvent into a second chamber of the separation unit, the first chamber and the second chamber being separated by a membrane,

(c) transporting at least the alkali metal ions of the alkali metal comprising catalyst from the first chamber into the second chamber by passing through the membrane due to a concentration gradient.

In contrast to the known processes, in which the polyetherol is neutralized and filtered, which involves solid handling, solid waste disposal and product loss in solid waste, in the inventive process there is no solid waste produced, which reduces the waste disposal costs. Further, there is no loss of polyetherol during the membrane separation whereas in a filtration process also polyetherol is lost. Finally, by using a membrane for removing the alkali metal ions from the polyetherol, a product can be achieved which contains alkali metal ions comparable to the polyetherol which is worked-up in a process as known from the art.

The reaction mixture comprising polyetherol and dissolved alkali metal comprising catalyst originates from a process to produce polyetherols. The process to produce polyether polyol could be a semi-batch process or a continuous process. In a Semi-batch process, the alkylene oxide is added in one sequence or multiple sequences to a mixture of H-functional starter containing alkali metal catalyst as per the required structure of the polyetherol. In a

Claims

1. A process for working-up a reaction mixture ~~(5)~~ comprising polyetherol and dissolved alkali metal comprising catalyst, wherein at least alkali metal ions of the dissolved alkali metal comprising catalyst are partially or completely removed from the mixture by a membrane separation process, the process comprising following steps:

   (a) feeding the reaction mixture ~~(5)~~ comprising polyetherol and dissolved alkali metal comprising catalyst into a first chamber ~~(1)~~ of a separation unit ~~(3)~~,

   (b) feeding a solvent into a second chamber ~~(7)~~ of the separation unit ~~(3)~~, the first chamber ~~(1)~~ and the second chamber ~~(7)~~ being separated by a membrane ~~(9)~~,

   (c) transporting at least the alkali metal ions of the alkali metal comprising catalyst from the first chamber ~~(1)~~ into the second chamber ~~(7)~~ by passing through the membrane ~~(9)~~ due to a concentration gradient.

2. The process according to claim 1, wherein the alkali metal comprising catalyst is an alkali metal hydroxide.

3. The process according to claim 1 or 2, wherein the membrane separation is a Donnan dialysis process.

4. The process according to one of claims 1 to 3, wherein the reaction mixture ~~(5)~~ comprising polyetherol and dissolved alkali metal comprising catalyst is a product stream of a reaction for producing polyetherol by reacting an alcoholate with alkylene oxide, the alcoholate being formed by reaction of an alcohol with an alkali metal comprising catalyst.

5. The process according to one of claims 1 to 4, wherein the alkali metal comprising catalyst is selected from the group consisting of sodium hydroxide or potassium hydroxide.

6. The process according to one of claims 1 to 5, wherein the membrane ~~(9)~~ is a cation exchange membrane.

7. The process according to one of claims 1 to 6, wherein the solvent is an aqueous acidic solution with optionally an added solvent selected from the group consisting of alcohols, ethers, ketones or mixtures thereof.

8. The process according to claim 7, wherein the acid is selected from the group comprising phosphoric acid, carbonic acid, hydrochloric acid, nitric acid or sulphuric acid or a mixture thereof.

9. The process according to one of claims 1 to 8, wherein the separating unit ~~(3)~~ comprises membrane modules, selected from hollow fibre modules, membrane modules, flat sheet modules, or modules with tubular configuration.

10. The process according to claim 9, wherein at least two of the membrane modules are connected in parallel or in series.

11. The process according to one of claims 1 to 10, wherein the membrane ~~(9)~~ is a polymer membrane

12. The process according to ~~one of~~ claim~~s 1 to~~ 11, wherein the polymer membrane comprises a support.

13. The process according to one of claims 1 to 12, wherein the separation process is carried out at a temperature in the range from 50 to 300°C.

14. The process according to one of claims 1 to 13, wherein the reaction mixture further comprises a solvent to improve the ionic mobility in the reaction mixture.

15. The process according to claim 14, wherein the solvent to improve the ionic mobility in the reaction mixture is selected from the group consisting of water, isopropanol, ethylene glycol, propylene glycol, methanol, ethanol, acetone and mixtures thereof.

16. The process according to any of claims 1 to 15, wherein the polyetherols produced are used for polyurethane applications.