Claims

1. A preparation method of a light colored modified isocyanate mixture, the method includes the following steps:

a) subjecting the isocyanate group of a raw material isocyanate to carbodiimidization under the action of a phosphorus heterocyclic catalyst to obtain a reaction solution of modified isocyanate containing carbodiimide and/or uretonimine derivatives;

b) adding a compounded terminator to the reaction solution obtained in step a) to terminate the carbodiimidization;

the compounded terminator is a compound of a halosilane organic and a sulfonic anhydride substance.

2. The preparation method according to claim 1, wherein, the reaction of step a) is carried out at a temperature of 40°C-210°C.

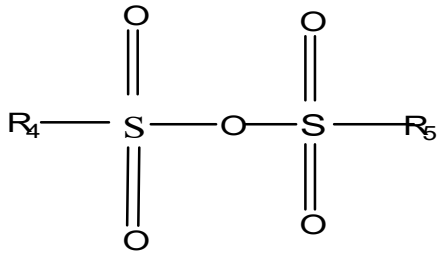
3. The preparation method according to claim 1, wherein, the halosilane organic has a chemical formula of the following formula (I):

$$R_1X_3Si \text{ or } R_1R_2X_2Si \text{ or } R_1R_2R_3X_1Si \quad (I)$$

in the molecular formula (I), R_1, R_2 and R_3 independently represent aliphatic, aromatic, araliphatic, cycloaliphatic groups optionally containing heteroatoms, wherein R_1, R_2 and R_3 can be the same or different; and two groups of R_1, R_2 and R_3 can be connected to each other to form a ring structure;

X represents the halogen element selected from the group consisting of fluorine, chlorine, bromine and iodine.

4. The preparation method according to claim 1, wherein, the sulfonic anhydride substance has the following structural formula (II) :



（II）

in the structural formula (II), R_4 and R_5 independently represent aliphatic, aromatic, araliphatic, or cycloaliphatic groups optionally contain heteroatoms and/or other functional groups, wherein R_4 and R_5 can be the same or different, the two groups R_4 and R_5 are optionally connected to each other to form a ring structure.

5. The preparation method according to claim 1, wherein, the compounded terminator is a compound of diphenyldifluorosilane and p-toluenesulfonic anhydride.

6. The preparation method according to claim 1, wherein, the temperature condition of adding the compounded terminator to terminate the carbodiimidation of step b) is 40-70°C.

7. The preparation method according to claim 1, wherein, the amount of compounded terminator is based on the weight of the raw material isocyanate, the amount of halosilane organic is 50-2000ppm; the amount of sulfonic anhydride substance is 10- 200ppm.

8. The preparation method according to claim 1, wherein, the catalyst used for preparing the isocyanate containing carbodiimide and/or uretonimine derivatives is a phospholene catalyst and/or a phospholene oxide, the amount of the catalyst is 0.1-10 ppm, relative to the weight of the raw material isocyanate.

9. The preparation method according to claim 1, wherein, the raw material isocyanate is one or more selected from the group consisting of aromatic, araliphatic, aliphatic, and cycloaliphatic diisocyanates.

10. The preparation method according to claim 1, wherein, when the reaction time of the carbodiimidation reaches 10 min-24h, the compounded terminator is added to terminate the reaction.

11. The preparation method according to claim 3, wherein, in the molecular formula (I), R_1, R_2 and R_3 independently represent C1-C10 hydrocarbyl, C6-C15 aromatic, C7-C15 araliphatic, or C3-C12 cycloaliphatic groups optionally containing heteroatoms.

12. The preparation method according to claim 11, wherein in the molecular formula (I), R_1, R_2

and R_3 independently represent phenyl, tolyl, ethylphenyl, phenmethyl or phenyethyl optionally containing heteroatoms.

13. The preparation method according to claim 3, wherein, the halosilane organic is selected from the group consisting of diphenyldifluorosilane, diphenyldichlorosilane, tritylfluorosilane, tert-butyltrichlorosilane and combinations thereof.

14. The preparation method according to claim 4, wherein, in the structural formula (II), R_4 and R_5 independently represent C1-C10 hydrocarbyl, C6-C15 aromatic, C7-C15 araliphatic, or C3-C12 cycloaliphatic groups optionally contain heteroatoms and/or other functional groups.

15. The preparation method according to claim 14, wherein, in the structural formula (Ⅱ), R_4 and R_5 independently represent phenyl, tolyl, ethylphenyl, phenmethyl, phenethyl, cyclopropyl, cyclobutyl, cyclohexyl or cyclopentyl optionally containing heteroatoms and/or other functional groups.

16. The preparation method according to claim 4, wherein, the sulfonic anhydride substance is selected from the group consisting of p-toluenesulfonic anhydride, methanesulfonic anhydride, ethylsulfonic anhydride, trifluoromethanesulfonic anhydride and combinations thereof.

17. The preparation method according to claim 7, wherein, the amount of compounded terminator is based on the weight of the raw material isocyanate, the amount of halosilane organic is 100-600ppm; the amount of sulfonic anhydride substance is 10-100ppm.

18. The preparation method according to claim 7, wherein, the compounding mass ratio of the halosilane organic and the sulfonic anhydride substance is 2-6:1.

19. The preparation method according to claim 8, wherein, the amount of the catalyst is 0.2-2ppm relative to the weight of the raw material isocyanate.

20. The preparation method according to claim 9, wherein, the raw material isocyanate is diphenylmethane diisocyanate.