an esterified substance is obtained, a process in which free trifluoromethanesulfonic acid is removed through a depressurization treatment.

[0008]

According to the embodiment of the invention, in the method, the reaction mixture contains the 1-alkene having 5 to 80 carbon atoms.

[0009]

According to the embodiment of the invention, in the method, the proportion of the 1-alkene having 5 to 80 carbon atoms in the reaction mixture, measured through GPC, is more than or equal to 8% by area and less than or equal to 20% by area.

[0010]

According to the embodiment of the invention, in the method, the 1-alkene is a 1-alkene having 28 to 60 carbon atoms.

[0011]

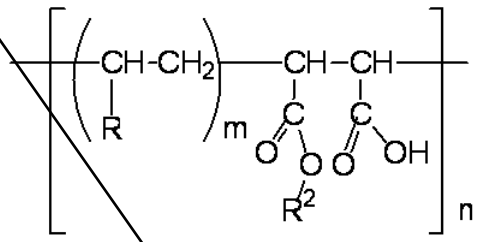
According to the embodiment of the invention, in the method, the alcohol is stearyl alcohol.

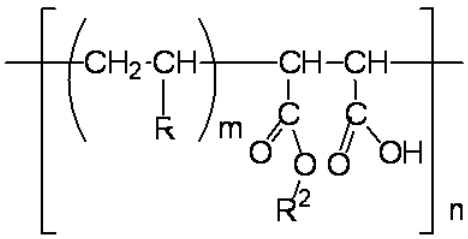
[0012]

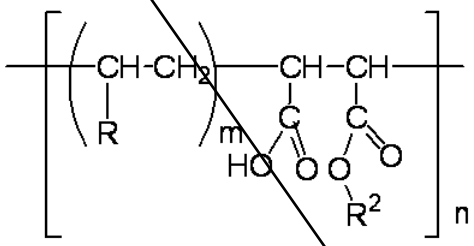
According to the embodiment of the invention, in the method, the amount of the trifluoromethanesulfonic acid is more than or equal to 100 ppm and less than or equal to 1000 ppm with respect to the total mass of the copolymer and the alcohol having 5 to 25 carbon atoms.

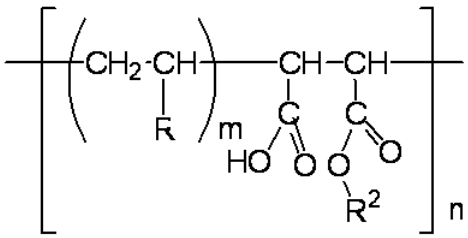
[0013]

According to the invention, it is possible to obtain a reaction mixture in which the content of a sulfonic acid component is reduced using trifluoromethanesulfonic acid as a catalyst in a reaction


(c)


(d)


(e)


(f)

[0025]

In the formulae (c) to (f), R represents an aliphatic hydrocarbon group having 3 to 78 carbon atoms, R^2 represents a hydrocarbon group having 5 to 25 carbon atoms, m represents the copolymerization molar ratio X/Y of the 1-alkene (X) to the maleic anhydride (Y) and is 1/2 to 10/1, and n is an integer of more than or equal to 1.

[0026]

Examples of the esterified substance of the invention include (1) an esterified substance singly including at least one of the formulae (c) to (f) in the main-chain skeleton; (2) an esterified substance including at least two of the formulae (c) to (f) in the main-chain skeleton randomly, regularly, or in a block shape; and the like, and the above may be used singly or in mixture of more than or equal to two kinds.

[0027]

The reaction yield of the esterification reaction between the copolymer and the alcohol is preferably more than or equal to 70 mol%, more preferably more than or equal to 80 mol%, and still more preferably more than or equal to 90%.

an esterified substance is obtained, a process in which free trifluoromethanesulfonic acid is removed through a depressurization treatment.

[0008]

According to the embodiment of the invention, in the method, the reaction mixture contains the 1-alkene having 5 to 80 carbon atoms.

[0009]

According to the embodiment of the invention, in the method, the proportion of the 1-alkene having 5 to 80 carbon atoms in the reaction mixture, measured through GPC, is more than or equal to 8% by mass and less than or equal to 20% by mass.

[0010]

According to the embodiment of the invention, in the method, the 1-alkene is a 1-alkene having 28 to 60 carbon atoms.

[0011]

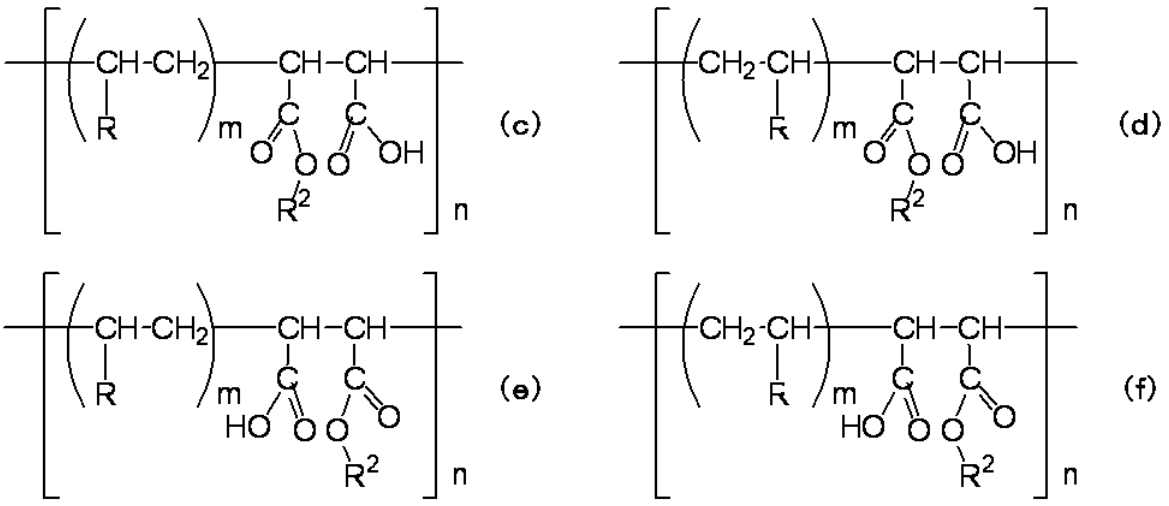
According to the embodiment of the invention, in the method, the alcohol is stearyl alcohol.

[0012]

According to the embodiment of the invention, in the method, the amount of the trifluoromethanesulfonic acid is more than or equal to 100 ppm and less than or equal to 1000 ppm with respect to the total mass of the copolymer and the alcohol having 5 to 25 carbon atoms.

[0013]

According to the invention, it is possible to obtain a reaction mixture in which the content of a sulfonic acid component is reduced using trifluoromethanesulfonic acid as a catalyst in a reaction



[0025]

In the formulae (c) to (f), R represents an aliphatic hydrocarbon group having 3 to 78 carbon atoms, R^2 represents a hydrocarbon group having 5 to 25 carbon atoms, m represents the copolymerization molar ratio X/Y of the 1-alkene (X) to the maleic anhydride (Y) and is 1/2 to 10/1, and n is an integer of more than or equal to 1.

[0026]

Examples of the esterified substance of the invention include (1) an esterified substance singly including at least one of the formulae (c) to (f) in the main-chain skeleton; (2) an esterified substance including at least two of the formulae (c) to (f) in the main-chain skeleton randomly, regularly, or in a block shape; and the like, and the above may be used singly or in mixture of more than or equal to two kinds.

[0027]

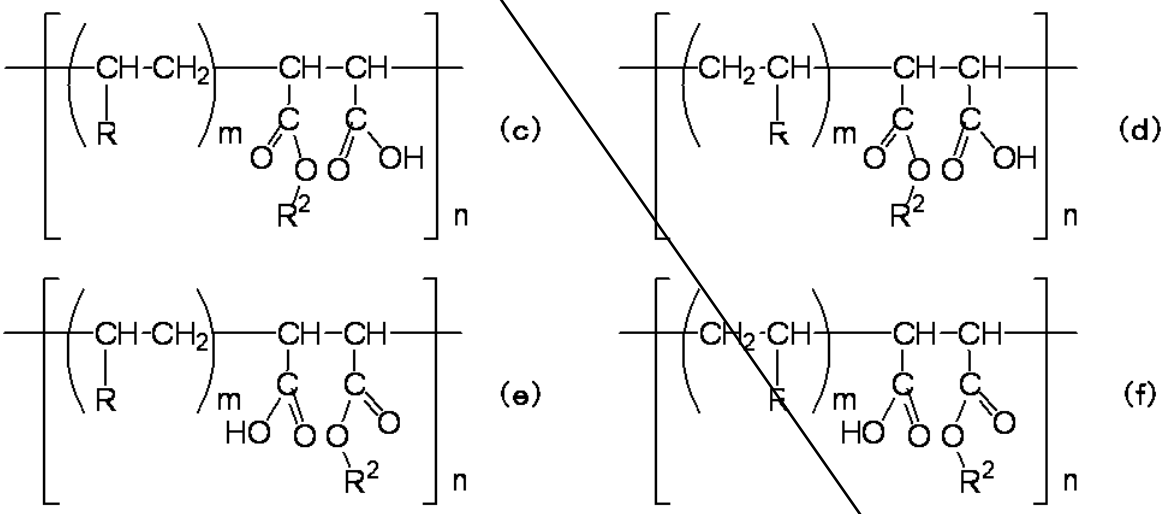
The reaction yield of the esterification reaction between the copolymer and the alcohol is preferably more than or equal to 70 mol%, more preferably more than or equal to 80 mol%, and still more preferably more than or equal to 90 mol%.

CLAIMS

1. A method of manufacturing an esterified substance comprising:

a process in which a copolymer is obtained by copolymerizing a 1-alkene having 5 to 80 carbon atoms and maleic anhydride; and

a process in which an esterification reaction of the copolymer and an alcohol having 5 to 25 carbon atoms is caused in a presence of trifluoromethanesulfonic acid in order to obtain a reaction mixture containing an esterified substance including at least one repetition unit selected from formulae (c) to (f).



(in the formulae (c) to (f), R represents an aliphatic hydrocarbon group having 3 to 78 carbon atoms, R^2 represents a hydrocarbon group having 5 to 25 carbon atoms, m represents the copolymerization molar ratio X/Y of the 1-alkene (X) to the maleic anhydride (Y) and is 1/2 to 10/1, and n is an integer of more than or equal to 1.)

2. The method according to Claim 1, further comprising:

after the process in which a reaction mixture containing an esterified substance is obtained, a process in which free trifluoromethanesulfonic acid is removed through a depressurization treatment.

3. The method according to Claim 1,

wherein the reaction mixture contains the 1-alkene having 5 to 80 carbon atoms.

4. The method according to Claim 3,

wherein a proportion of the 1-alkene having 5 to 80 carbon atoms in the reaction mixture, measured through GPC, is more than or equal to 8% by mass and less than or equal to 20% by mass.

5. The method according to Claim 1,

wherein the 1-alkene is a 1-alkene having 28 to 60 carbon atoms.

6. The method according to Claim 1,

wherein the alcohol is stearyl alcohol.

7. The method according to Claim 1,

wherein an amount of the trifluoromethanesulfonic acid is more than or equal to 100 ppm and less than or equal to 1000 ppm with respect to a total mass of the copolymer and the alcohol having 5 to 25 carbon atoms.

CLAIMS

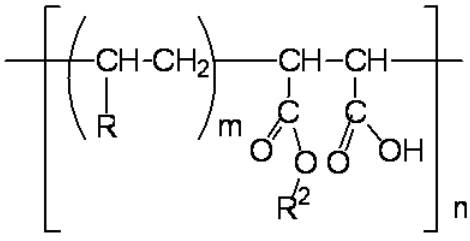
1. A method of manufacturing an esterified substance comprising:

a process in which a copolymer is obtained by copolymerizing a 1-alkene having 28 to 60 carbon atoms and maleic anhydride; and

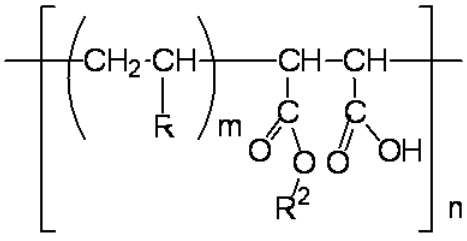
a process in which an esterification reaction of the copolymer and an alcohol having 5 to 25 carbon atoms is caused in a presence of trifluoromethanesulfonic acid in order to obtain a reaction mixture containing an esterified substance including at least one repetition unit selected from formulae (c) to (f); and

after the process in which a reaction mixture containing an esterified substance is obtained, a process in which free trifluoromethanesulfonic acid is removed through a depressurization treatment, wherein

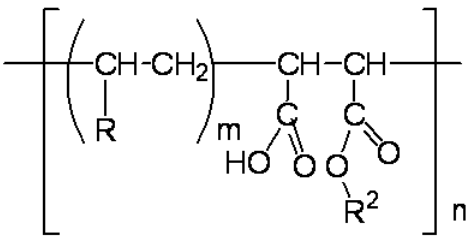
in the formulae (c) to (f), R represents an aliphatic hydrocarbon group having 3 to 78 carbon atoms, R^2 represents a hydrocarbon group having 5 to 25 carbon atoms, m represents the copolymerization molar ratio X/Y of the 1-alkene (X) to the maleic anhydride (Y) and is 1/2 to 10/1, and n is an integer of more than or equal to 1.



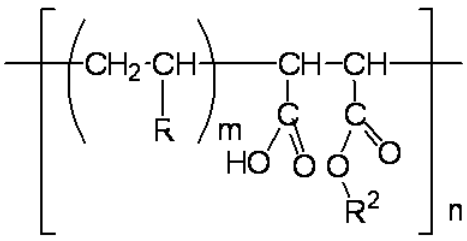
(c)



(d)



(e)



(f)

2. The method according to Claim 1,

wherein the reaction mixture contains the 1-alkene having 28 to 60 carbon atoms.

3. The method according to Claim 2,

wherein a proportion of the 1-alkene having 28 to 60 carbon atoms in the reaction mixture, measured through GPC, is more than or equal to 8% by mass and less than or equal to 20% by mass.

4. The method according to Claim 1,

wherein the alcohol is stearyl alcohol.

5. The method according to Claim 1,

wherein an amount of the trifluoromethanesulfonic acid is more than or equal to 100 ppm and less than or equal to 1000 ppm with respect to a total mass of the copolymer and the alcohol having 5 to 25 carbon atoms.