transparency.

Increasing the solubility deteriorates the flexibility or mechanical strength of the resulting film, which may cause cracks, or make it difficult to smooth out creases.

Increasing the solubility also reduces the adhesion of the resulting film. Such a film may cause practical problems such as misalignment during the conveying step.

CITATION LIST

- Patent Literature

[0004]

Patent Literature 1: JP H09-067441 A

SUMMARY

- Technical problem

[0005]

The present disclosure aims to provide a vinyl alcohol-vinyl acetate copolymer having excellent solubility and capable of providing a film having high flexibility, high mechanical strength, and high adhesion, and a method for producing a vinyl alcohol-vinyl acetate copolymer.

- Solution to problem

[0005a]

The present invention relates to a vinyl alcohol-vinyl acetate copolymer comprising a unit of vinyl alcohol and a unit of vinyl acetate,

the vinyl alcohol-vinyl acetate copolymer having a triad unit chain ratio T_{OO} of 7.5 or less, where the triad unit chain ratio T_{OO} is obtained using the following formula (1):

[Math. 1]

$$T_{OO}=\frac{[\text{Vac content}]\times[\text{OOO proportion}]\times 2}{[\text{VOH content}]\times[\text{AOO proportion}]} \quad (1)$$

wherein the VOH content ratio represents the amount of the unit of vinyl alcohol, the Vac content ratio represents the amount of the unit of vinyl acetate, the OOO proportion represents the proportion of a triad OOO, and the AOO proportion represents the proportion of a triad AOO.

[0006]

The present disclosure relates to a vinyl alcohol-vinyl acetate copolymer including a unit of vinyl alcohol and a unit of vinyl acetate, the vinyl alcohol-vinyl acetate copolymer having a triad unit chain ratio T_{OO} of 7.5 or less, where the triad unit chain ratio T_{OO} is obtained using the following formula (1).

The present disclosure is described in detail below.

[0007]

[Math. 1]

$$T_{OO}=\frac{[\text{Vac content}]\times[\text{OOO proportion}]\times 2}{[\text{VOH content}]\times[\text{AOO proportion}]} \quad (1)$$

In the formula (1), the VOH content ratio represents the amount of the unit of vinyl alcohol, the Vac content ratio represents the amount of the unit of vinyl acetate, the OOO proportion represents the proportion of a triad OOO, and the AOO proportion represents the proportion of a triad AOO.

[0008]

Herein, "AAA, AAO, OAO, AOA, AOO, and OOO" represent triads classified as follows when the vinyl alcohol-vinyl acetate copolymer is divided by triads including the unit of vinyl alcohol (also simply referred to as O) and the unit of vinyl acetate (also simply referred to as A):

"vinyl alcohol-centered triads" include "AOA, AOO, and OOO"; and

"vinyl acetate-centered triads" includes "AAA, AAO, and OAO".

Note that "AOO" and "OOA" are both represented as "AOO", and "AAO" and "OAA" are both represented as "AAO".

[0009]

The present inventors found out that the monomer chain structure in a vinyl alcohol-vinyl acetate copolymer is associated with the improvement of the properties of the copolymer.

The present inventors made further intensive studies to find out that a vinyl alcohol-vinyl acetate copolymer having excellent solubility and capable of providing a film having high flexibility, high mechanical strength, and high adhesion can be obtained by setting, within a predetermined range, a triad unit chain ratio obtained from the amount of each unit and the proportions of triads. Thus, the present disclosure was completed.

In particular, in the case of the vinyl alcohol-vinyl acetate copolymer of the present disclosure, since the lower critical solution temperature (LCST) can be shifted to a higher temperature region, dissolution at a higher temperature can be enabled, which allows the vinyl alcohol-vinyl acetate copolymer of the present disclosure to be used for a wider variety of applications.

When the vinyl alcohol unit has higher block properties, a hydrogen-bonded structure is formed between molecules or in a molecule, problematically leading to reduction in solubility or gel formation. In the case of the vinyl alcohol-vinyl acetate copolymer of the present disclosure, the whole polymer chain has a random structure to achieve high solubility, as well as effective prevention of gel formation.

As used herein, "high solubility" means that the vinyl alcohol-vinyl acetate copolymer has excellent ability to be dissolved (dissolution rate or dissolution amount) in

a solvent.

As used herein, "effective prevention of gel formation" means that gel formation due to components that are difficult to swell can be prevented in swelling the vinyl alcohol–vinyl acetate copolymer. A vinyl alcohol–vinyl acetate copolymer being less likely to cause such gel formation may also be referred to as having "excellent swellability".

[0010]

The vinyl alcohol–vinyl acetate copolymer of the present disclosure has a unit of vinyl alcohol and a unit of vinyl acetate.

The terms "unit of vinyl alcohol" and "unit of vinyl acetate" as used herein refer to "vinyl alcohol" and "vinyl acetate" present in the vinyl alcohol–vinyl acetate copolymer, respectively.

[0011]

The vinyl alcohol–vinyl acetate copolymer of the present disclosure has a triad unit chain ratio T_{OO} of 7.5 or less, where the triad unit chain ratio T_{OO} is obtained using the following formula (1).

The triad unit chain ratio T_{OO} is an index to determine, at a triad level, whether a unit connected to a vinyl alcohol–vinyl alcohol chain is vinyl alcohol or vinyl acetate. A triad unit chain ratio T_{OO} of 1 or more indicates that a vinyl alcohol unit is connected to the vinyl alcohol–vinyl alcohol chain, and a triad unit chain ratio T_{OO} close to 0 indicates that a vinyl acetate unit is connected to the vinyl alcohol–vinyl alcohol chain.

In the present disclosure, the triad unit chain ratio T_{OO} is 7.5 or less, indicating that the vinyl alcohol–vinyl acetate copolymer can provide a film having excellent solubility and high flexibility. The triad unit chain ratio T_{OO} is preferably 6.5 or less, more preferably 6 or less, still more preferably 5 or less, and is preferably

0.01 or more, more preferably 0.5 or more, still more preferably 1.0 or more.

[0012]

[Math. 2]

$$T_{OO}=\frac{[\text{Vac content}]\times[\text{OOO proportion}]\times 2}{[\text{VOH content}]\times[\text{AOO proportion}]} \quad (1)$$

In the formula (1), the VOH content ratio represents the amount of the unit of vinyl alcohol, the Vac content ratio represents the amount of the unit of vinyl acetate, the OOO proportion represents the proportion of the triad OOO, and the AOO proportion represents the proportion of the triad AOO.

[0013]

Besides the triad unit chain ratio T_{OO}, triad unit chain ratios T_{AO}, T_{AA}, and T_{OA} are obtained using the following formulas (2) to (4).

[0014]

[Math. 3]

$$T_{AO}=\frac{[\text{Vac content}]\times[\text{AOO proportion}]}{[\text{VOH content}]\times[\text{AOA proportion}]\times 2} \quad (2)$$

[0015]

[Math. 4]

$$T_{AA}=\frac{[\text{VOH content}]\times[\text{AAA proportion}]\times 2}{[\text{Vac content}]\times[\text{AAO proportion}]} \quad (3)$$

$$T_{OA}=\frac{[\text{VOH content}]\times[\text{AAO proportion}]}{[\text{Vac content}]\times[\text{OAO proportion}]\times 2} \quad (4)$$

In the formulas (2) to (4), the VOH content ratio represents the amount of the unit of vinyl alcohol, the Vac content ratio represents the amount of the unit of vinyl acetate, the AOO proportion represents the proportion of the triad AOO, the AOA proportion represents the proportion

of the triad AOA, the AAA proportion represents the proportion of the triad AAA, the AAO proportion represents the proportion of the triad AAO, and the OAO proportion represents the proportion of the triad OAO.

[0016]

In the vinyl alcohol–vinyl acetate copolymer of the present disclosure, the triad unit chain ratio T_{AO} obtained using the above formula (2) is preferably 0.04 or more and 1.65 or less, more preferably 0.20 or more and 1.15 or less.

The vinyl alcohol–vinyl acetate copolymer of the present disclosure has a T_{OO} of 7.5 or less, indicating that a relatively large number of triads OOO have a block structure. When the vinyl alcohol–vinyl acetate copolymer further has a T_{AO} of 0.5 or less, the copolymer has the triad AOA, that is, a chain of alternating A and O units. The structure is thus not just a simple block structure, so that excellent solubility, high swellability, and high flexibility can all be achieved.

[0017]

In the vinyl alcohol–vinyl acetate copolymer of the present disclosure, the triad unit chain ratio T_{AA} obtained using the above formula (3) is preferably 40 or less. With such a T_{AA}, more Os are located next to As despite the Vac compositional ratio, leading to good solubility.

The T_{AA} is more preferably 30 or less and is preferably 0.01 or more.

[0018]

In the vinyl alcohol–vinyl acetate copolymer of the present disclosure, the proportion of the triad OOO in the total amount of the vinyl alcohol-centered triads (AOA, AOO, and OOO) is preferably 70% or less. With the proportion within the above range, the unit of vinyl alcohol having a block structure is reduced, resulting in suppression of gel formation as well as enhancement of the solubility at higher temperature.

[0019]

In the vinyl alcohol-vinyl acetate copolymer of the present disclosure, the proportion of the triad AAA in the total amount of the vinyl acetate-centered triads (AAA, AAO, and OAO) is preferably 70% or less. With the proportion within the above range, the unit of vinyl acetate having a block structure is reduced, resulting in suppression of gel formation as well as enhancement of the solubility at higher temperature.

The smaller of the proportion of the triad OOO and the proportion of the triad AAA is preferably 50% or less.

[0020]

In the vinyl alcohol-vinyl acetate copolymer of the present disclosure, the unit of vinyl alcohol has a mean chain length L_O of preferably 1 or longer, more preferably 1.5 or longer, still more preferably 2.0 or longer.

A preferable upper limit thereof depends on the amount of the unit of vinyl alcohol. In the case where the amount of the unit of vinyl alcohol is smaller than the amount of the unit of vinyl acetate, the mean chain length L_O is preferably 5.9 or shorter.

The "mean chain length L_O of the unit of vinyl alcohol" as used herein can be calculated using the following formula (7).

In the formula (7), "I" represents the intensity obtained by ^{1}H-NMR. Specifically, "I_{OOO}" represents the intensity of OOO measured by ^{1}H-NMR.

[0021]

[Math. 5]

$$L_O = \frac{I_{OOO} + I_{AOO} + I_{AOA}}{I_{AOA} + I_{AOO}/2} \qquad (7)$$

[0022]

In the vinyl alcohol-vinyl acetate copolymer of the

present disclosure, the mean chain length L_A of the unit of vinyl acetate is preferably 1 or longer, more preferably 1.1 or longer, still more preferably 1.2 or longer. A preferable upper limit thereof depends on the amount of the unit of vinyl acetate. In the case where the amount of the unit of vinyl acetate is smaller than the amount of the unit of vinyl alcohol, the mean chain length L_A of the unit of vinyl acetate is preferably 4 or shorter.

The "mean chain length L_A of the unit of vinyl acetate" as used herein can be calculated using the following formula (8).

[0023]

[Math. 6]

$$L_A = \frac{I_{AAA} + I_{AAO} + I_{OAO}}{I_{OAO} + I_{AAO}/2} \qquad (8)$$

[0024]

The lower limit of the amount of the unit of vinyl alcohol in the vinyl alcohol–vinyl acetate copolymer of the present disclosure is preferably 0.2 mol% and the upper limit thereof is preferably 99.8 mol%. With the amount of the unit of vinyl alcohol within such a range, the function of the hydroxyl group that the vinyl alcohol possesses can be imparted to a vinyl alcohol–vinyl acetate copolymer molecule, enabling control of the solubility in water or a solvent. The lower limit of the amount of the unit of vinyl alcohol is more preferably 50 mol% and the upper limit thereof is more preferably 98 mol%.

[0025]

The lower limit of the amount of the unit of vinyl acetate in the vinyl alcohol–vinyl acetate copolymer of the present disclosure is preferably 0.2 mol% and the upper limit thereof is preferably 99.8 mol%. With the amount of the unit of vinyl acetate within such a range, the function

of the hydroxyl group in the vinyl alcohol can be imparted to a vinyl alcohol–vinyl acetate copolymer molecule, enabling control of the solubility in water or a solvent. The lower limit of the amount of the unit of vinyl acetate is more preferably 2 mol% and the upper limit thereof is more preferably 50 mol%.

[0026]

The vinyl alcohol–vinyl acetate copolymer of the present disclosure may have any molecular weight. It preferably has a number average molecular weight of 1,000 to 1,000,000.

The vinyl alcohol–vinyl acetate copolymer of the present disclosure preferably has a degree of polymerization of 200 to 3,000. When the degree of polymerization is within the above range, good film physical properties can be exhibited.

The vinyl alcohol–vinyl acetate copolymer of the present disclosure preferably has a melting point of 30°C to 240°C. The melting point can be measured with a differential scanning calorimeter.

[0027]

The vinyl alcohol–vinyl acetate copolymer of the present disclosure preferably has a ratio (T_{OO}/VOH) of the T_{OO} to the amount of the unit of vinyl alcohol (VOH) of 0.001 to 0.10, more preferably 0.08 or less.

[0028]

The vinyl alcohol–vinyl acetate copolymer of the present disclosure preferably has a product of degree of chain polymerization (PDOH) of 1 or more and 18 or less, where the PDOH is obtained by the following formula (10) using the Too and the degree of polymerization (DP). When the PDOH is within the above range, the vinyl alcohol–vinyl acetate copolymer has a high degree of polymerization while suppressing the formation of hydrogen bonds, reducing the amount of components that are difficult to swell. The

resulting film thus can have good general physical property values. The product of degree of chain polymerization is more preferably 2 or more and 15 or less.

[0029]

[Math. 7]

$$\text{Product of degree of chain polymerization (PDOH)} = T_{OO} \times \log_{10}(DP) \quad (10)$$

[0030]

The vinyl alcohol-vinyl acetate copolymer of the present disclosure preferably has a ratio of degree of chain polymerization (RDOH) of 0.01 or more and 2.7 or less, where the RDOH is obtained by the following formula (11) using the Too and the degree of polymerization (DP). When the RDOH is within the above range, the vinyl alcohol-vinyl acetate copolymer has a high degree of polymerization while suppressing the formation of hydrogen bonds, reducing the amount of components that are difficult to swell. The resulting film thus can have good general physical property values. The ratio of degree of chain polymerization is more preferably 0.1 or more and 2.5 or less.

[0031]

[Math. 8]

$$\text{Ratio of degree of chain polymerization (RDOH)} = T_{OO} / \log_{10}(DP) \quad (11)$$

[0032]

The vinyl alcohol-vinyl acetate copolymer of the present disclosure preferably has an A-centered slope value of -5.0 or more and 2.0 or less, where the A-centered slope value is calculated by the following formula (12) using the AAA proportion, the OAO proportion, and the amount of the unit of vinyl acetate (Vac content ratio). When the A-centered slope value is within the above range, the amount of components that are difficult to swell is reduced, so that the resulting film can have good general physical property values. The A-centered slope value is more

preferably -4.0 or more and 1.0 or less.

[0033]

[Math. 9]

$$\text{A-centered slope value} = (\text{AAA proportion} - \text{OAO proportion})/(\text{CD}\times\text{Vac content}) \quad (12)$$

In the formula (12), CD represents the chemical shift difference between the peaks.

[0034]

In the vinyl alcohol-vinyl acetate copolymer of the present disclosure, the product of the amount of the unit of vinyl acetate (Vac content ratio) and the mean chain length L_A (Vac content ratio × mean chain length L_A × 0.01, hereafter, also referred to as acetyl chain ratio) is preferably 2.5 or less, more preferably 1.0 or less, still more preferably 0.25 or less. With the acetyl chain ratio within the above range, excellent solubility and suppression of gel formation can be both achieved.

[0035]

The vinyl alcohol-vinyl acetate copolymer of the present disclosure preferably has a randomness value (mean persistence ratio) R of 0.5 or higher. The randomness value R is obtained using the following formula (5) where L_O represents the mean chain length of the unit of vinyl alcohol and L_A represents the mean chain lengths of the unit of vinyl acetate.

The randomness value R is an index to determine whether the whole polymer chain has a block structure or a random structure. When the randomness value R is 0, the whole polymer chain has a block structure. When the randomness value R is 1, the whole polymer chain has a random structure.

When the randomness value R is 2, the unit of vinyl alcohol and the unit of vinyl acetate coexist alternately in a molecule.

When the randomness value R is 0.5 or higher in the

present disclosure, the polyvinyl alcohol-vinyl acetate copolymer of the present disclosure is considered to be a resin excellent in solubility. The randomness value R is more preferably 0.6 or higher, still more preferably 0.9 or higher, while preferably 2 or lower.

[0036]

[Math. 10]

$$R = \frac{1}{L_A} + \frac{1}{L_O} \qquad (5)$$

[0037]

The vinyl alcohol-vinyl acetate copolymer of the present disclosure may have a unit of a different monomer.

The different monomer is not limited. Preferably, it is a monomer having at least one polar group selected from the group consisting of carboxyl, hydroxyl, amide, amino, epoxy, and ether groups and one olefinic double bond. Examples of such a monomer include crotonic acid, maleic acid, fumaric acid, citraconic acid, mesaconic acid, itaconic acid, allyl alcohol, vinyl ether, and allylamine.

[0038]

The amount of the unit of a different monomer in the vinyl alcohol-vinyl acetate copolymer of the present disclosure is determined according to the intended use and therefore is not limited. The amount of the unit of a different monomer is preferably 20% by weight or less, more preferably 10% by weight or less, still more preferably 5% by weight or less, relative to the whole vinyl alcohol-vinyl acetate copolymer.

[0039]

The vinyl alcohol-vinyl acetate copolymer of the present disclosure is preferably produced by, for example, a method including the step of transesterification of polyvinyl acetate or a raw material vinyl alcohol-vinyl acetate copolymer using a dianionic zincate complex

represented by the following formula (6) (transesterification method). The present disclosure also encompasses such a method for producing the vinyl alcohol–vinyl acetate copolymer.

The vinyl alcohol–vinyl acetate copolymer of the present disclosure may also be produced by reacetylating polyvinyl alcohol (reacetylation method).

[0039a]

The present invention relates to a method for producing the vinyl alcohol–vinyl acetate copolymer as described herein, comprising transesterification of polyvinyl acetate or a raw material vinyl alcohol–vinyl acetate copolymer using a dianionic zincate complex represented by the following formula (6):

[Chem. 1]

$$t\text{-}Bu_nR_{4-n}ZnM_m \qquad (6)$$

wherein n represents an integer of 1 to 4, m represents 1 or 2, Rs may be the same as or different from one another when n represents 1 or 2 and each represent a C1–C8 alkyl, alkenyl, aryl, or arylalkyl group, and M represents lithium or magnesium.

[0040]

The method for producing the vinyl alcohol–vinyl acetate copolymer of the present disclosure (transesterification method) includes the step of transesterification of polyvinyl acetate or a raw material vinyl alcohol–vinyl acetate copolymer using a dianionic zincate complex represented by the following formula (6).

The use of the dianionic zincate complex enables favorable production of a vinyl alcohol–vinyl acetate copolymer having a randomness value within a predetermined range. Moreover, the use of the dianionic zincate complex enables progress of the transesterification in a very short reaction time. Specifically, the reaction can proceed in a

time roughly one-tenth of the time needed for transesterification using CH_3ONa.

[0041]

[Chem. 1]

$$t\text{-}Bu_nR_{4-n}ZnM_m \quad (6)$$

In the formula (6), n represents an integer of 1 to 4, m represents 1 or 2, Rs may be the same as or different from one another when n represents 1 or 2 and each represent a C1–C8 alkyl, alkenyl, aryl, or arylalkyl group, and M represents lithium or magnesium.

[0042]

Specific examples of the C1–C8 alkyl, alkenyl, aryl, or arylalkyl group include methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, sec-butyl, t-butyl, n-pentyl, n-hexyl, vinyl, phenyl, and benzyl groups.

[0043]

M represents lithium or magnesium. When M represents lithium, m represents 2. When M represents magnesium, m represents 1.

[0044]

The dianionic zincate complex represented by the above formula (6) is disclosed in JP 2004-292328 A and can be prepared by the method described in JP 2004-292328 A.

Specifically, examples of dilithium salts include dilithium tetra-t-butylzincate, dilithium tri-t-butyl methylzincate, dilithium tri-t-butyl ethylzincate, dilithium tri-t-butyl-n-propylzincate, dilithium tri-t-butyl-n-butylzincate, dilithium tri-t-butyl-i-butylzincate, dilithium tri-t-butyl-sec-butylzincate, dilithium di-t-butyl dimethylzincate, dilithium di-t-butyl diethylzincate, dilithium di-t-butyl di-n-propylzincate, dilithium di-t-butyl di-n-butylzincate, dilithium di-t-butyl di-i-butylzincate, dilithium di-t-butyl di-sec-butylzincate, dilithium t-butyl trimethylzincate, dilithium t-butyl

triethylzincate, dilithium t-butyl tri-n-propylzincate, dilithium t-butyl tri-n-butylzincate, dilithium t-butyl tri-i-butylzincate, and dilithium t-butyl tri-sec-butylzincate.

Examples of magnesium salts include magnesium tetra-t-butylzincate, magnesium tri-t-butyl methylzincate, magnesium tri-t-butyl ethylzincate, magnesium tri-t-butyl-n-propylzincate, magnesium tri-t-butyl-n-butylzincate, magnesium tri-t-butyl-i-butylzincate, magnesium tri-t-butyl-sec-butylzincate, magnesium di-t-butyl dimethylzincate, magnesium di-t-butyl diethylzincate, magnesium di-t-butyl di-n-propylzincate, magnesium di-t-butyl di-n-butylzincate, magnesium di-t-butyl di-i-butylzincate, magnesium di-t-butyl di-sec-butylzincate, magnesium t-butyl trimethylzincate, magnesium t-butyl triethylzincate, magnesium t-butyl tri-n-propylzincate, magnesium t-butyl tri-n-butylzincate, magnesium t-butyl tri-i-butylzincate, and magnesium t-butyl tri-sec-butylzincate.

In particular, the dianionic zincate complex represented by the above formula (6) is preferably a dilithium salt, and preferably has a C1-C4 alkyl group. Particularly preferred is dilithium tetra-t-butylzincate (TBZL).

The dianionic zincate complexes may be used alone or in combination of two or more thereof.

The TBZL can be prepared by the method described in Example 1 in JP 2004-292328 A.

[0045]

The raw material used in the transesterification method may be polyvinyl acetate or a raw material vinyl alcohol-vinyl acetate copolymer.

In the case of using polyvinyl acetate, the vinyl alcohol-vinyl acetate copolymer of the present disclosure can be prepared in a short reaction time.

In the case of using a raw material vinyl alcohol–vinyl acetate copolymer, the vinyl alcohol–vinyl acetate copolymer of the present disclosure having a higher randomness value can be prepared.

Moreover, in the case of employing the transesterification method, after transesterification of polyvinyl acetate using a dianionic zincate complex represented by the above formula (6), the resulting vinyl alcohol–vinyl acetate copolymer may be further transesterified using a dianionic zincate complex represented by the above formula (6).

The raw material vinyl alcohol–vinyl acetate copolymer may be, as well as a conventional commercially available vinyl alcohol–vinyl acetate copolymer, a vinyl alcohol–vinyl acetate copolymer obtained by transesterification of polyvinyl acetate using a dianionic zincate complex.

[0046]

The reaction temperature for the transesterification is not limited, and may be set as appropriate within a range of −80°C to 200°C. The reaction temperature is within a range of preferably −80°C to 80°C, more preferably −50°C to 50°C. The dianionic zincate complex is effective as a reaction catalyst at low temperature and is particularly effective when used in a temperature range of not higher than 50°C.

[0047]

The transesterification may be performed at a normal pressure or a reduced pressure.

The reaction time of the transesterification may be adjusted such that the transesterification is completed.

Moreover, at the time of the transesterification, by-product alcohol can be removed by azeotropy with an organic solvent.

[0048]

In the transesterification, the lower limit of the amount of a dianionic zincate catalyst is preferably 0.001 mol and the upper limit thereof is preferably 0.5 mol, per 1 mol of the polyvinyl acetate. The lower limit is more preferably 0.001 mol and the upper limit is more preferably 0.1 mol. The lower limit is still more preferably 0.005 mol and the upper limit is still more preferably 0.05 mol.

[0049]

In the transesterification of polyvinyl acetate using the dianionic zincate complex, a preferred method includes, for example, dissolving polyvinyl acetate in a solvent, adding the dianionic zincate complex to the solution for carrying out transesterification, and further adding an acid to terminate the transesterification.

The solvent is not limited, and examples thereof include methanol, toluene, dimethyl sulfoxide, ethanol, acetone, diethyl ether, tetrahydrofuran, water, and solvent mixtures containing these.

[0050]

The transesterification may be performed in a homogeneous system or a heterogeneous system.

The homogeneous system is a system in which a substance is present at a homogeneous concentration, referring to a state where components are dissolved in a solvent. The heterogeneous system is a heterogeneous

reaction system in which a substance is localized along with the progress of the reaction, referring to a state where some components such as resin are not dissolved during the progress of the reaction.

[0051]

The transesterification carried out in a homogeneous system enables production of a vinyl alcohol–vinyl acetate copolymer in which a group of vinyl alcohol–centered triads has a random structure and a group of vinyl acetate–centered triads has a block structure.

The transesterification carried out in a heterogeneous system enables production of a vinyl alcohol–vinyl acetate copolymer in which a group of vinyl alcohol–centered triads has a block structure and a group of vinyl acetate–centered triads has a random structure.

[0052]

As an exemplary method for reacetylating the polyvinyl alcohol, the polyvinyl alcohol may be added to a solvent containing acetic acid to be reacted.

[0053]

The vinyl alcohol–vinyl acetate copolymer of the present disclosure may be used for applications such as raw materials of viscosity modifiers for aqueous solutions, gas barrier coating agents, suspending agents, emulsifiers, polarizers, water–soluble films, dispersants, and various resins.

– Advantageous Effects of Invention

[0054]

The present disclosure can provide a vinyl alcohol–vinyl acetate copolymer having excellent solubility and capable of providing a film having high flexibility, high mechanical strength, and high adhesion, and a method for producing a vinyl alcohol–vinyl acetate copolymer. Producing a film using the vinyl alcohol–vinyl acetate

copolymer of the present disclosure can effectively prevent trouble such as cracking or difficulty in smoothing out creases, and also can prevent misalignment during conveying.

Producing a film using the vinyl alcohol-vinyl acetate copolymer can also reduce insolubles due to components that are difficult to swell.

DESCRIPTION OF EMBODIMENTS