methylphenylsiloxane, diphenylsiloxane, or a combination there of.

[0030] Furthermore, the above structures derived from substituted aliphatic, alicyclic, alkenyl, aryl, heteroaryl, siloxane, poly(butadiene-co-acrylonitrile) and poly(alkylene oxide) are alkyl group, alkenyl group, alkynyl group, hydroxyl group, oxo group, alkoxy group, mercapto group, cycloalkyl group, substituted cycloalkyl group, heterocyclic group, substituted heterocyclic group, aryl group, substituted aryl group, heteroaryl group, substituted heteroaryl group, aryloxy group, substituted aryloxy group, halogen, haloalkyl group, cyano group, nitro group, nitrone group, amino group, amide group, -C(O)H, acyl group, oxyacyl group, carboxyl group, carbamate group, sulfonyl group, sulfonamide group, sulfuryl group, or -C(O)-, -S-, -$S(O)_2$-, -OC(O)-O-, -NA-C(O)-, -NAC(O)-NA-, -OC(O)-NA-, (in the formula, A is H or an alkyl group with 1 to 6 carbons), and it is preferable that one terminal further contains a substituent that is selected from the substituted groups.

[0031] Further, it is preferable that the above-described maleimide resin composes 50 mass% or more of the resin component.

[0032] Further, it is preferable that it contains a filler.

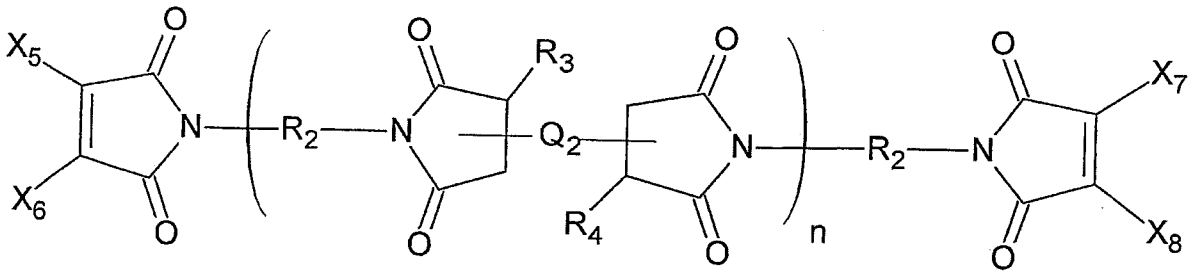
[0033] The present disclosure relates to a maleimide adhesive film with dicing tape, which comprises such maleimide film laminated on a dicing tape.

[0033a] In an aspect, there is provided a maleimide adhesive film, comprising a maleimide resin and a radical initiator with a one-hour half-life temperature of 200 °C or higher, wherein the maleimide resin is the bismaleimide resin of General Formula (2).

(In the formula, R_2 and Q_2 are independently selected from the group consisting of structures derived from unsubstituted or substituted aliphatic, alicyclic, alkenyl, aryl, heteroaryl, siloxane, poly(butadiene-co-acrylonitrile) and poly(alkylene oxide). X_5 to X_8 are independently H or an alkyl group with 1 to 6 carbons. R_3 and R_4 are independently H or CH_3. n = 1 to 30.)

General Formula (2)

[Chemical Formula 1]

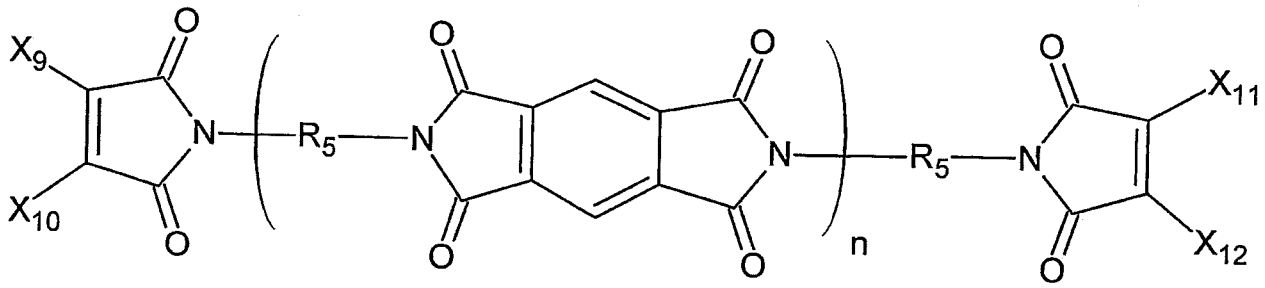


[0033b] In another aspect, there is provided a maleimide adhesive film comprising a maleimide resin and a radical initiator with a one-hour half-life temperature of 200 °C or higher, wherein the maleimide resin is the bismaleimide resin of General Formula (3).

(In the formula, R_5 is independently selected from the group consisting of structures derived from unsubstituted or substituted aliphatic, alicyclic, alkenyl, aryl, heteroaryl, siloxane, poly(butadiene-co-acrylonitrile) and poly(alkylene oxide). X_9 to X_{12} are independently H or an alkyl group with 1 to 6 carbons. n = 1 to 30.)

General Formula (3)

[Chemical Formula 2]



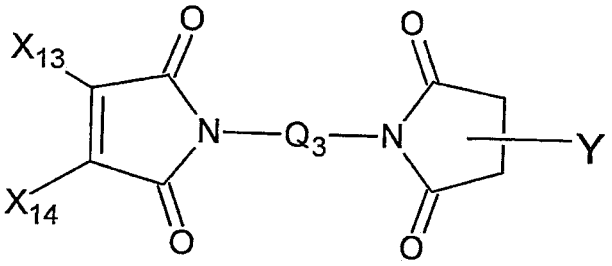
[0033c] In another aspect, there is provided a maleimide adhesive film comprising a maleimide resin and a radical initiator with a one-hour half-life temperature of 200 °C or higher, wherein the maleimide resin is the maleimide resin of General Formula (4).

(In the formula, Q_3 is independently selected from the group consisting of structures derived from unsubstituted or substituted aliphatic, alicyclic, alkenyl, aryl, heteroaryl,

siloxane, poly(butadiene-co-acrylonitrile) and poly(alkylene oxide). X_{13}, X_{14} are independently H or an alkyl group with 1 to 6 carbons. Y is a substituted or unsubstituted aliphatic or aromatic.)

General Formula (4)

[Chemical Formula 3]

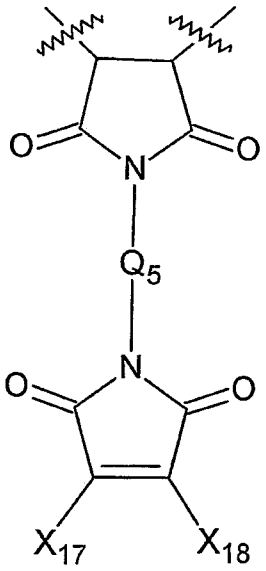


[0033d] In another aspect, there is provided a maleimide adhesive film comprising a maleimide resin and a radical initiator with a one-hour half-life temperature of 200 °C or higher, wherein the maleimide resin is a maleimide resin that comprises a plurality of repeating units having the structural formula of General Formula (6).

(In the formula, Q_5 is a substituted or unsubstituted aliphatic part, aromatic part, heteroaromatic part, or siloxane part. X_{17} and X_{18} are independently H or an alkyl group with 1 to 6 carbons.)

General Formula (6)

[Chemical Formula 4]



[0033e] In another aspect, there is provided a maleimide adhesive film with dicing tape, which comprises the maleimide adhesive film as defined above laminated on to a dicing tape.

Effect

[0034] The present disclosure successfully provides a maleimide film that utilizes maleimide resin that shows high heat history resistance and is highly reliable, as well as an adhesive film with dicing tape that is obtained by laminating such maleimide film on a dicing tape.

BRIEF DESCRIPTION OF DRAWINGS

[0035] [FIG. 1] FIG. 1 shows an adhesive film with dicing tape that utilizes and comprises the adhesive agent of the present invention.

[FIG. 2] FIG. 2 is a sectional scheme of an embodiment of the adhesive film with dicing tape that differs from FIG. 1.

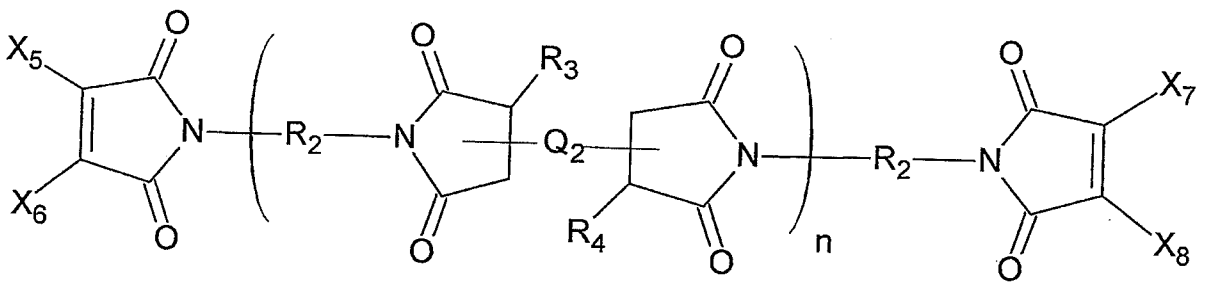
Claims

1. A maleimide adhesive film, comprising a maleimide resin and a radical initiator with a one-hour half-life temperature of 200 °C or higher, wherein the maleimide resin is the bismaleimide resin of General Formula (2).

(In the formula, R_2 and Q_2 are independently selected from the group consisting of structures derived from unsubstituted or substituted aliphatic, alicyclic, alkenyl, aryl, heteroaryl, siloxane, poly(butadiene-co-acrylonitrile) and poly(alkylene oxide). X_5 to X_8 are independently H or an alkyl group with 1 to 6 carbons. R_3 and R_4 are independently H or CH_3. n = 0 to 30.)

General Formula (2)

[Chemical Formula 1]

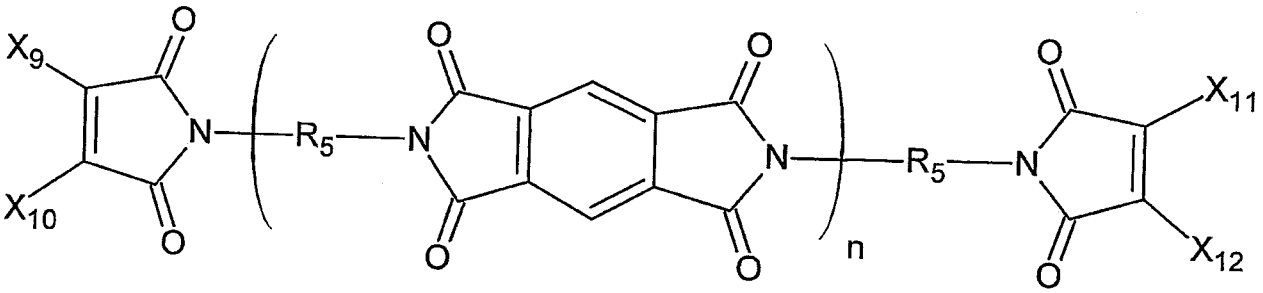


2. A maleimide adhesive film comprising a maleimide resin and a radical initiator with a one-hour half-life temperature of 200 °C or higher, wherein the maleimide resin is the bismaleimide resin of General Formula (3).

(In the formula, R_5 is independently selected from the group consisting of structures derived from unsubstituted or substituted aliphatic, alicyclic, alkenyl, aryl, heteroaryl, siloxane, poly(butadiene-co-acrylonitrile) and poly(alkylene oxide). X_9 to X_{12} are independently H or an alkyl group with 1 to 6 carbons. n = 1 to 30.)

General Formula (3)

[Chemical Formula 2]



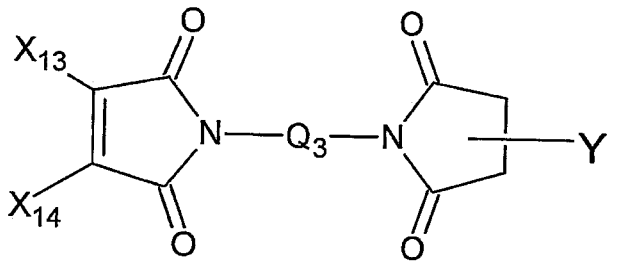
3. A maleimide adhesive film comprising a maleimide resin and a radical initiator with a one-hour half-life temperature of 200 °C or higher, wherein the maleimide resin is the maleimide resin of General Formula (4).

(In the formula, Q_3 is independently selected from the group consisting of structures derived from unsubstituted or substituted aliphatic, alicyclic, alkenyl, aryl, heteroaryl,

siloxane, poly(butadiene-co-acrylonitrile) and poly(alkylene oxide). X_{13}, X_{14} are independently H or an alkyl group with 1 to 6 carbons. Y is a substituted or unsubstituted aliphatic or aromatic.)

General Formula (4)

[Chemical Formula 3]

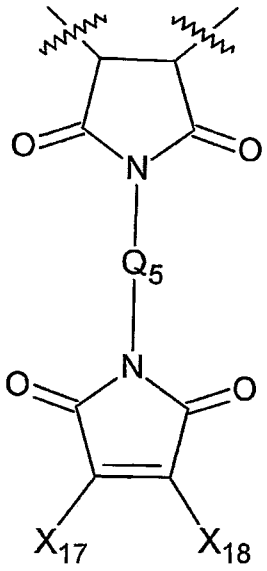


4. A maleimide adhesive film comprising a maleimide resin and a radical initiator with a one-hour half-life temperature of 200 °C or higher, wherein the maleimide resin is a maleimide resin that comprises a plurality of repeating units having the structural formula of General Formula (6).

(In the formula, Q_5 is a substituted or unsubstituted aliphatic part, aromatic part, heteroaromatic part, or siloxane part. X_{17} and X_{18} are independently H or an alkyl group with 1 to 6 carbons.)

General Formula (6)

[Chemical Formula 4]



5. The maleimide adhesive film according to any one of Claims 1 to 4, wherein one of R_2, R_5, Q_2, Q_3, Q_4, Q_5 comprises a cyclic structure.

6. The maleimide adhesive film according to Claim 5, wherein the cyclic structure is any one of the structures shown in General Formula (7).

General Formula (7)

[Chemical Formula 5]

7. The maleimide adhesive film according to any one of Claims 1 to 6, wherein the siloxane part is dimethylsiloxane, methylphenylsiloxane, diphenylsiloxane, or a combination thereof.

8. The maleimide adhesive film according to any one of Claims 1 to 7, wherein the structures derived from substituted aliphatic, alicyclic, alkenyl, aryl, heteroaryl, siloxane, poly(butadiene-co-acrylonitrile) and poly(alkylene oxide) are alkyl group, alkenyl group, alkynyl group, hydroxyl group, oxo group, alkoxy group, mercapto group, cycloalkyl group, substituted cycloalkyl group, heterocyclic group, substituted heterocyclic group, aryl group, substituted aryl group, heteroaryl group, substituted heteroaryl group, aryloxy group, substituted aryloxy group, halogen, haloalkyl group, cyano group, nitro group, nitrone group, amino group, amide group, -C(O)H, acyl group, oxyacyl group, carboxyl group, carbamate group, sulfonyl group, sulfonamide group, sulfuryl group, or -C(O)-, -S-, -$S(O)_2$-, -OC(O)-O-, -NA-C(O)-, -NAC(O)-NA-, -OC(O)-NA- (in the formula, A is H or an alkyl group with 1 to 6 carbons), and one terminal further contains a substituent that is selected from the substituted groups.

9. The maleimide adhesive film according to any one of Claims 1 to 8, wherein the amount of the maleimide resin is 50 percent by mass or more of the resin component.

10. The maleimide adhesive film according to any one of Claims 1 to 9, which further comprises a filler.

11. A maleimide adhesive film with dicing tape, which comprises the maleimide adhesive film according to any one of Claims 1 to 10 laminated on to a dicing tape.