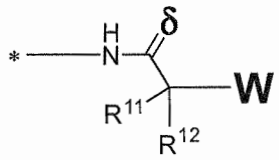
wherein Z is a di- or higher-valent organic group containing 2 or more carbon atoms, V is a structure as represented by chemical formula (2), and k is an integer of 2 or more.

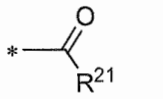
[Chemical formula 2]



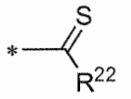
(2)

Wherein δ represents oxygen or sulfur atom and W represents an electron-withdrawing group, and R^{11} and R^{12} represent independently a hydrogen atom or a hydrocarbon group containing 1 to 10 carbon atoms, wherein W in chemical formula (2) given above is represented by any one of chemical formulae (3) to (10):

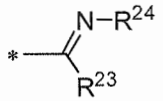
[Chemical formula 3]



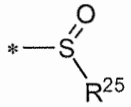
(3)



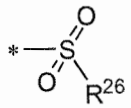
(4)



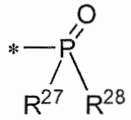
(5)



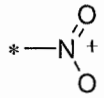
(6)



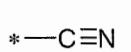
(7)



(8)



(9)



(10)

wherein R^{21} to R^{28} are independently a hydrocarbon group containing 1 to 10 carbon atoms or an organic group containing 1 to 10 carbon atoms and comprising hydrogen and carbon as essential elements and 1 to 10 other atoms of elements selected from the group of boron, oxygen, sulfur, nitrogen, phosphorus, silicon, and halogens.

[0009]

The present disclosure provides a polyamic acid resin composition that contains: (a) polyamic acid and (b) a compound as represented by chemical formula (1).

[0010]

[Chemical formula 1]



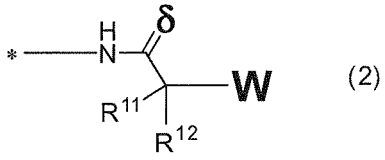
(1)

[0011]

(In chemical formula (1), Z is a di- or higher-valent organic group containing 2 or more carbon atoms, V is a structure as represented by chemical formula (2), and k is an integer of 2 or more.)

[0012]

[Chemical formula 2]



(2)

[0013]

(In chemical formula (2), δ represents oxygen or sulfur atom and W represents an electron-withdrawing group, and R^{11} and R^{12} represent independently a hydrogen atom or a hydrocarbon group containing 1 to 10 carbon atoms.

[0013a]

In a second aspect, there is provided a polyimide film comprising polyimide as produced by imidizing a polyamic acid resin composition as defined above.

[0013b]

In a third aspect, there is provided a production method for polyimide film comprising a step for imidizing a polyamic acid resin composition as defined above.

[0013c]

In a fourth aspect, there is provided a coated glass substrate produced by coating a glass substrate with a varnish containing a polyamic acid resin composition as defined above and removing the solvent by drying.

[0013d]

In a fifth aspect, there is provided a glass substrate coated with polyimide film produced by heating the coated glass substrate as defined above at a temperature of 180°C to 600°C.

[0013e]

In a sixth aspect, there is provided a production method for a glass substrate coated with polyimide film comprising a step for imidizing, by heating, a coated glass substrate as defined above.

[0013f]

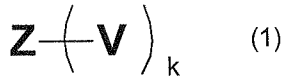
In a seventh aspect, there is provided the polyimide film as defined above or the polyimide film produced by the production method as defined above for use in surface protect film and interlayer insulation film of semiconductor elements, insulation layers and spacer layers of organic electroluminescent elements (organic EL elements), planarizing film of thin film transistor substrates, insulation layers of organic transistors, flexible printed boards, substrates for flexible display, substrates for flexible electronic paper, substrates for flexible solar batteries, substrates for flexible color filters, binders for electrodes of lithium ion secondary batteries, and adhesives for

Claims

[Claim 1]

A polyamic acid resin composition comprising (a) polyamic acid and (b) a compound as represented by chemical formula (1):

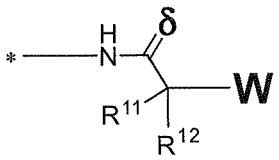
[Chemical formula 1]



(1)

wherein Z is a di- or higher-valent organic group containing 2 or more carbon atoms, V is a structure as represented by chemical formula (2), and k is an integer of 2 or more.

[Chemical formula 2]



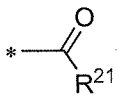
(2)

Wherein δ represents oxygen or sulfur atom and W represents an electron-withdrawing group, and R^{11} and R^{12} represent independently a hydrogen atom or a hydrocarbon group containing 1 to 10 carbon atoms.

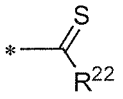
~~[Claim 2]~~

~~A polyamic acid resin composition as described in claim 1~~, wherein W in chemical formula (2) given above is represented by any one of chemical formulae (3) to (10):

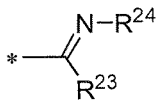
[Chemical formula 3]



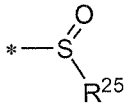
(3)



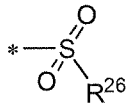
(4)



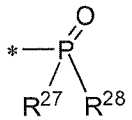
(5)



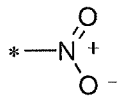
(6)



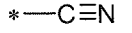
(7)



(8)



(9)



(10)

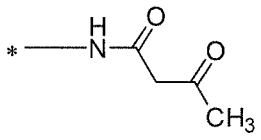
wherein R^{21} to R^{28} are independently a hydrocarbon group containing 1 to 10 carbon atoms or an organic group containing 1 to 10 carbon atoms and comprising hydrogen and carbon as essential elements and 1 to 10 other atoms of elements selected from the group of boron, oxygen, sulfur,

nitrogen, phosphorus, silicon, and halogens.

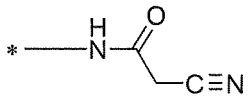
[Claim 32]

A polyamic acid resin composition as described in either claim 1~~ or 2~~, wherein V in chemical formula (1) given above is represented by any one of chemical formulae (11) to (13):

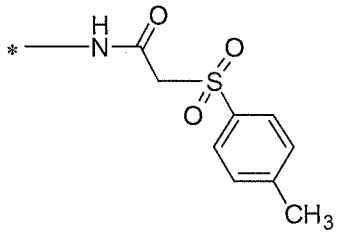
[Chemical formula 4]



(11)



(12)



(13)

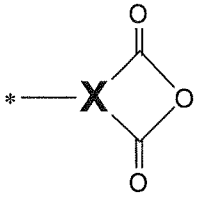
[Claim 43]

A polyamic acid resin composition as described in ~~any one of~~ claims 1 ~~to~~or 2~~3~~, wherein k in chemical formula (1) is an integer of 2 or 3.

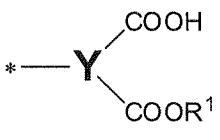
[Claim 54]

A polyamic acid resin composition as described in any one of claims 1 to 34, wherein "(a) polyamic acid" contains a structure as represented by chemical formula (14) or (15):

[Chemical formula 5]



(14)



(15)

wherein X in Chemical formula (14) denotes a tri- or higher-valent organic group containing 2 or more carbon atoms; Y in chemical formula (15) denotes a tri- or higher-valent organic group

containing 2 or more carbon atoms; and R^1 denotes a hydrogen atom, a hydrocarbon group containing 1 to 10 carbon atoms, or an alkylsilyl group containing 1 to 10 carbon atoms.

[Claim 5~~6~~]

Polyimide film comprising polyimide as produced by imidizing a polyamic acid resin composition as described in any one of claims 1 to 5~~4~~.

[Claim 6~~7~~]

A production method for polyimide film comprising a step for imidizing a polyamic acid resin composition as described in any one of claims 1 to 5~~4~~.

[Claim 7~~8~~]

A coated glass substrate produced by coating a glass substrate with a varnish containing a polyamic acid resin composition as described in any one of claims 1 to ~~5~~-4 and removing the solvent by drying.

[Claim 8~~9~~]

A glass substrate coated with polyimide film produced by heating the coated glass substrate as described in claim 7 at a temperature of 180°C to 600°C.

[Claim 9~~10~~]

A production method for a glass substrate coated with polyimide film comprising a step for imidizing, by heating, a coated glass substrate as described in claim 8~~7~~.

[Claim 10~~11~~]

The polyimide film of claim 6 or the polyimide film produced by the production method of claim ~~7~~ 6 for use in surface protect film and interlayer insulation film of semiconductor elements, insulation layers and spacer layers of organic electroluminescent elements (organic EL elements), planarizing film of thin film transistor substrates, insulation layers of organic transistors, flexible printed boards, substrates for flexible display, substrates for flexible electronic paper, substrates for flexible solar batteries, substrates for flexible color filters, binders for electrodes of lithium ion secondary batteries, and adhesives for semiconductors.

[Claim 11~~12~~]

The polyimide film of claim 6 or the polyimide film produced by the production method of claim ~~7~~ 6 for use in a method of production for a surface protect film and interlayer insulation film of semiconductor elements, insulation layers and spacer layers of organic electroluminescent elements (organic EL elements), planarizing film of thin film transistor substrates, insulation layers of organic transistors, flexible printed boards, substrates for flexible display, substrates for flexible electronic paper, substrates for flexible solar batteries, substrates for flexible color filters, binders for electrodes of lithium ion secondary batteries, and adhesives for semiconductors.