a gas barrier layer, which are prepared with the t4ransparent polyimide resin film of the present disclosure, and a flexible display panel prepared therewith.

[Solution to Problem]

[0013]

The present inventors conducted studies on the above-mentioned problems and speculated that white turbidity of a film was generated due to the crystallization of the polyimide and the phase separation of the copolymer. On the other hand, the present inventors speculated that cracking and foaming were generated due to low affinity between a polyimide precursor and solvent molecules. And then, by making efforts to solve the problems from the viewpoints described above, the present inventors have reached the configuration of the present disclosure.

[0014]

~~That is, in a first aspect, t~~There is provided a polyimide precursor having a unit structure expressed by a general formula (1) and a unit structure expressed by a general formula (2).

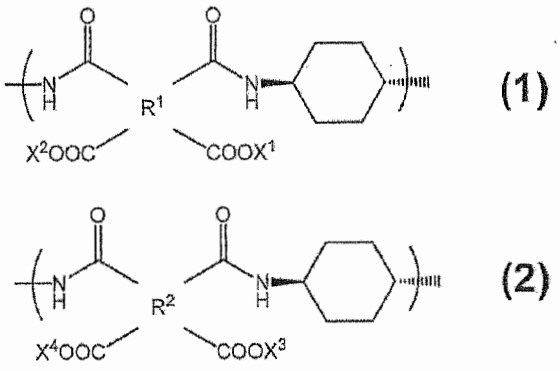
[0015]

[Chem. 1]

(In the general formula (4), R^3 and R^4 each independently represent a monovalent organic group with 1 to 10 carbon atoms.)

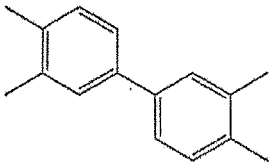
[0018a] In a first aspect, there is provided a polyimide precursor having a unit structure expressed by a general formula (1) and a unit structure expressed by a general formula (2):

[Chem. 1]

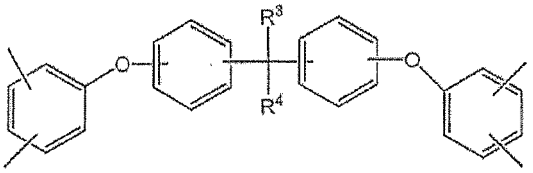


wherein in the general formulas (1) and (2), X^1 to X^4 each independently represent a hydrogen atom, a monovalent organic group with 1 to 10 carbon atoms or a monovalent alkylsilyl group with 1 to 10 carbon atoms; R^1 is represented by a general formula (3) and R^2 is represented by a general formula (4);

[Chem. 2]



(3)



(4)

and wherein in the general formula (4), R^3 and R^4 each independently represent a monovalent organic group with 1 to 10 carbon atoms.

[0018ba]

In a second aspect, there is provided a polyimide prepared from a polyimide precursor as defined above.

[0018cb]

In a third aspect, there is provided a flexible substrate comprising a resin film containing a polyimide as defined above.

[0018de]

In a fourth aspect, there is provided a flexible substrate comprising an inorganic film disposed on a resin film containing a polyimide as defined above.

[0018ed]

In a fifth aspect, there is provided a color filter comprising a black matrix and a colored pixel disposed on a resin film containing a polyimide as defined above.

[0018fe]

In a sixth aspect, there is provided a production method of a color filter as defined above, comprising the following steps of:

(1) applying a resin composition containing a polyimide precursor as defined above and a solvent on a support substrate;

(2) removing the solvent from the coated resin composition;

(3) obtaining a polyimide-containing resin film by imidizing the polyimide precursor in the resin composition;

(4) forming a black matrix and a colored pixel on the polyimide-containing resin film; and

(5) peeling off the polyimide-containing resin film from the support substrate.

[0018g~~f~~]

In a seventh aspect, there is provided a flexible display device prepared by bonding a light-emitting element to a color filter as defined above.

[0018h~~g~~]

In an eighth aspect, there is provided a flexible display device equipped with a light-emitting element disposed on a flexible substrate as defined above.

[Advantageous Effects]

[0019]

According to the present disclosure, there is provided a polyimide precursor which does not cause white turbidity, cracking and foaming of a film irrespective of the curing

condition in the production process of the polyimide resin film.

[Brief Description of Drawings]

[0020]

[Fig. 1A]

Fig. 1A is a cross-sectional view showing an example of a flexible CF.

[Fig. 1B]

Fig. 1B is a cross-sectional view showing an example of a flexible CF.

[Fig. 1C]

Fig. 1C is a cross-sectional view showing an example of a flexible CF.

[Fig. 1D]

Fig. 1D is a cross-sectional view showing an example of a flexible CF.

[Fig. 2]

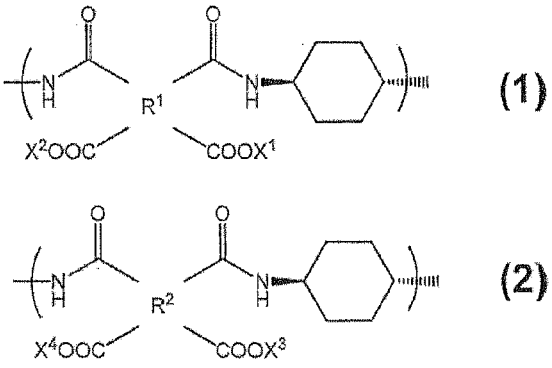
Fig. 2 is a cross-sectional view showing an example of an array composed of a flexible organic EL element.

[CLAIMS]

[Claim 1]

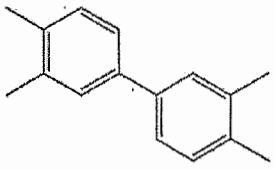
A polyimide precursor having a unit structure expressed by a general formula (1) and a unit structure expressed by a general formula (2):

[Chem. 1]

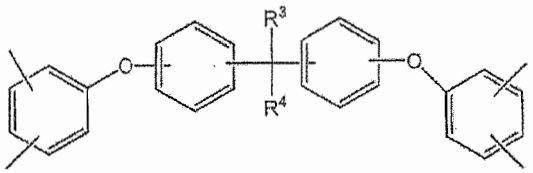


wherein in the general formulas (1) and (2), X^1 to X^4 each independently represent a hydrogen atom, a monovalent organic group with 1 to 10 carbon atoms or a monovalent alkylsilyl group with 1 to 10 carbon atoms; R^1 is represented by a general formula (3) and R^2 is represented by a general formula (4);

[Chem. 2]



(3)



(4)

(~~I~~and wherein in the general formula (4), R^3 and R^4 each independently represent a monovalent organic group with 1 to 10 carbon atoms.)

[Claim 2]

The polyimide precursor according to claim 1, wherein a ratio of the unit structure expressed by a general formula (1) to the unit structure expressed by a general formula (2) [the number of moles of the unit structure expressed by a general formula (1)/the number of moles of the unit structure expressed by a general formula (2)] is 70/30 to 99.5/0.5.

[Claim 3]

A polyimide prepared from a polyimide precursor according to claim 1 or 2.

[Claim 4]

A flexible substrate comprising a resin film containing