[Non-Patent Literature]

[0010]

[NPL 1]

SID '13Digest, pp268-271 (2013)

[Summary ~~of Invention~~]

[Technical Problem]

[0011]

In an actual production process of a polyimide film, from the viewpoints of utilization of existing facilities and enhancement in productivity by shortening the curing time, it is preferred that the cure of a polyimide precursor resin film be performed on a hot plate or in an oven previously heated to a high temperature. However, in a conventional polyimide in which 3,3',4,4'-biphenyl tetracarboxylic acid dianhydride and trans-1,4-cyclohexyldiamine are used as parts of the raw materials, it has been found that white turbidity, cracking and foaming are generated in the film under the curing condition described above.

[0012]

In view of the above-mentioned problems, the present ~~invention~~ disclosure is aimed at providing a polyimide precursor which does not cause white turbidity, cracking and foaming of a film irrespective of the curing condition of the film. Furthermore, the present disclosure~~invention~~ is aimed at providing a flexible TFT array, a flexible color filter and a flexible substrate with

a gas barrier layer, which are prepared with the t4ransparent polyimide resin film of the present ~~invention~~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 ~~invention~~disclosure.

[0014]

That is, in a first aspect, ~~the present invention is directed to~~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 second aspect, there is provided a polyimide prepared from a polyimide precursor as defined above.

[0018b]

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

[0018c]

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.

[0018d]

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.

[0018e]

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.

[0018f]

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.

[0018g]

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 ~~of Invention~~]

[0019]

According to the present ~~invention~~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.